

Appendix A

CHART Assessment for the Puget Sound Chinook Salmon ESU

CHART Participants

The CHART for this ESU consisted of the following NOAA Fisheries biologists: DeeAnn Kirkpatrick (CHART Leader), Steve Fransen, Tom Hooper, Steve Keller, Mike Parton, and Tim Tynan. Steve Ralph (Environmental Protection Agency) is another Federal biologist who served on this CHART.

The following biologists working for NOAA Fisheries provided valuable expertise to the CHART, but were not part of the deliberations or formal scoring/rating process: Bill Graeber (NOAA Fisheries) and Tom Sibley (NOAA Fisheries). This CHART assessment also benefitted from review and comments by staff from the Nooksack Indian Tribe, Point No Point Treaty Council, and Washington Department of Fish and Wildlife.

ESU Description

The Puget Sound Chinook ESU was listed as a threatened species in 1999 (64 FR 14308; March 24, 1999). The ESU includes all naturally spawned populations of Chinook salmon from rivers and streams flowing into Puget Sound including the Strait of Juan de Fuca from the Elwha River, eastward, including rivers and streams flowing into Hood Canal, South Sound, North Sound and the Strait of Georgia in Washington). The agency recently conducted a review to update the ESU's status, taking into account new information and considering the net contribution of hatchery efforts in the ESU. We recently published the results of this review and concluded that Puget Sound Chinook salmon (including 26 hatchery programs) should remain listed as threatened (70 FR 37160; June 28, 2005).

The following life history descriptions are taken from the NOAA Fisheries status review of Chinook salmon (Myers et al. 1998). Adult spring-run Chinook salmon in the Puget Sound typically return to freshwater in April and May and spawn in August and September (Orrell 1976, WDFW et al. 1993). Adults migrate to the upper portions of their respective river systems and hold in pools until they mature. In contrast, summer-run fish begin their freshwater migration in June and July and spawn in September, while summer/fall-run Chinook salmon begin to return in August and spawn from late September through January (WDF et al. 1993). In rivers with an overlap in spawning time, temporal runs on the same river system maintain a certain amount of reproductive isolation through geographic separation.

The majority of Puget Sound fish emigrate to the ocean as subyearlings. Many of the rivers have well-developed estuaries that are important rearing areas for emigrating ocean-type smolts. In contrast, the Suiattle and South Fork Nooksack Rivers have been characterized as producing a majority of yearling smolts (Marshall et al. 1995). Glacially influenced conditions on the Suiattle River may be responsible for limiting juvenile growth, delaying smolting, and producing a higher proportion of 4- and 5-year-olds compared to other Chinook salmon stocks in Puget Sound, which mature predominantly as 3- and 4-year-olds. Puget Sound stocks exhibit a similarity in marine distribution based on coded wire tag recoveries in ocean fisheries. Tagged fish have been primarily captured in Canadian coastal and Puget Sound waters.

Myers et al. (1998) also noted that anthropogenic activities have limited the access to historical spawning grounds and altered downstream flow and thermal conditions. Water diversion and hydroelectric dams have prevented access to portions of several rivers. Watershed development and activities throughout Puget Sound, Hood Canal, and Strait of Juan de Fuca regions have resulted in increased sedimentation, higher water temperatures, decreased large woody debris recruitment, decreased gravel recruitment, a reduction in river pools and spawning areas, and a loss of estuarine rearing areas (Bishop and Morgan 1996). These impacts on the spawning and rearing environment may also have had an impact on the expression of many life-history traits and masked or exaggerated the distinctiveness of many stocks.

Juvenile Chinook salmon in freshwater feed on a variety of terrestrial and aquatic insects and crustaceans, while subadults feed on similar items as well as larger prey including fishes, shrimp, and squid (Scott and Crossman, 1973). One study noted that adults in marine waters forage on a large array of fish species, especially herring and sand lance (Pritchard and Tester 1944 as cited in Scott and Crossman 1973).

Recovery Planning Status

A Technical Recovery Team (TRT) was formed in 2000 to assist recovery planning efforts in Puget Sound. In 2001 and 2002, the Puget Sound TRT released technical reports describing independent populations of Chinook salmon in Puget Sound (Ruckelshaus et al. 2001, 2002). The Puget Sound TRT identified 22 independent Chinook populations: the North Fork Nooksack River, South Fork Nooksack River, Lower Skagit River, Upper Skagit River, Lower Sauk River, Suiattle River, Upper Sauk River, Cascade River, North Fork Stillaguamish River, South Fork Stillaguamish River, Skykomish River, Snoqualmie River, North Lake Washington, Cedar River, Green/Duwamish River, Puyallup River, White River, Nisqually River, Skokomish

River, Dosewallips River, Dungeness River, and Elwha River. Some naturally spawning aggregations of Chinook were not recognized as part of these populations (e.g., the Deschutes River in South Puget Sound). The TRT concluded that Chinook salmon using smaller streams in south and central Puget Sound probably did not occur there in large numbers historically and were not independent populations. It is not clear whether these smaller streams are occupied due to recent hatchery releases or whether historically they supported small satellite “sink” populations that were dependent on larger independent “source” populations (Ruckelshaus et al. 2002; B. Graeber, NMFS, personal communication).

The Puget Sound TRT identified five geographic regions of diversity and correlated risk in Puget Sound that are intended to assist in evaluating ESU-wide recovery planning (Ruckelshaus et al. 2002). The regions are based on similarities in hydrographic, biogeographic, geologic, and catastrophic risk characteristics and where groups of populations have evolved in common (Ruckelshaus et al. 2002). The Puget Sound Chinook salmon ESU occupies all of these regions. Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of such regions (Ruckelshaus et al. 2002, McElhany et al. 2003). From 2003 through early 2005, local planning groups in Puget Sound developed watershed assessments and specific recovery action plans for each watershed. The CHART considered the TRT products in rating each watershed, but did not have the benefit of all watershed plans. We anticipate that, as recovery planning proceeds, we will have better information and may revise our recommendations regarding critical habitat designation.

CHART Area Assessments

The CHART assessment for this ESU addressed 18 subbasins containing 61 occupied watersheds as well as 19 nearshore marine zones. As part of its assessment the CHART considered the conservation value of each watershed in the context of the populations within the five geographic regions of diversity and correlated risk in Puget Sound identified by the Puget Sound TRT (Ruckelshaus et al. 2002). Information is presented below by USGS subbasin because they present a convenient and systematic way to organize the CHART’s watershed assessments for this ESU and their names are generally more recognizable because they typically identify major river systems.

Strait of Georgia Subbasin (HUC4# 17110002)

The Strait of Georgia subbasin is located in northern Puget Sound (near the U.S. Canada border) and contained in Skagit and Whatcom counties, Washington. The subbasin

contains three watersheds occupied by this ESU and these watersheds encompass approximately 428 mi². Fish distribution and habitat use data from WDFW identify approximately 71 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). However, Ruckelshaus et al. (2001, 2004) did not identify any historically independent populations in this subbasin. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A1 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Nooksack Subbasin (HUC4# 17110004)

The Nooksack subbasin is located in northern Puget Sound and contained in Skagit and Whatcom counties, Washington. The subbasin contains five watersheds occupied by this ESU these watersheds encompass approximately 795 mi². Fish distribution and habitat use data from WDFW identify approximately 268 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified two historically independent populations in this subbasin: North Fork Nooksack River and South Fork Nooksack River. Occupied reaches in one HUC5 (Upper North Fork Nooksack River) overlap with a FEMAT key watershed for at-risk anadromous salmonids (FEMAT 1994). The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A2 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Upper Skagit Subbasin (HUC4# 17110005)

The Upper Skagit subbasin is located in northern Puget Sound and contained in Skagit and Whatcom counties, Washington. The subbasin contains five watersheds occupied by this ESU and these watersheds encompass approximately 999 mi². Fish distribution and habitat use data from WDFW identify approximately 105 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified six historically independent populations in this subbasin: Lower Skagit River, Upper Skagit River, Cascade River, Lower Sauk River, Suiattle River, and Upper Sauk River. The CHART concluded that all of the occupied areas contained one or more

PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A3 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Sauk Subbasin (HUC4# 17110006)

The Sauk subbasin is located in northern Puget Sound and contained in Skagit and Snohomish counties, Washington. The subbasin contains four watersheds occupied by this ESU and these watersheds encompass approximately 741 mi² and 2,234 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 118 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003).

Ruckelshaus et al. (2001, 2004) identified three historically independent populations in this subbasin: Lower Sauk River, Suiattle River, and Upper Sauk River. Occupied reaches in four HUC5s (Upper Suiattle River, Lower Suiattle River, Upper Sauk River, and Lower Sauk River) overlap with FEMAT key watersheds for at-risk anadromous salmonids (FEMAT 1994). The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A4 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Lower Skagit Subbasin (HUC4# 17110007)

The Lower Skagit subbasin is located in northern Puget Sound and contained in Skagit and Snohomish counties, Washington. The subbasin contains two watersheds occupied by this ESU and these watersheds encompass approximately 447 mi² and 1,592 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 149 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003).

Ruckelshaus et al. (2001, 2004) identified six historically independent populations in this subbasin: Lower Skagit River, Upper Skagit River, Cascade River, Lower Sauk River, Suiattle River, and Upper Sauk River. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or

migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A5 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Stillaguamish Subbasin (HUC4# 17110008)

The Stillaguamish subbasin is located in north-central Puget Sound and contained in Skagit and Snohomish counties, Washington. The subbasin contains three watersheds occupied by this ESU and these watersheds encompass approximately 704 mi² and 2,302 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 179 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified two historically independent populations in this subbasin: North Fork Stillaguamish River and South Fork Stillaguamish River. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A6 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Skykomish Subbasin (HUC4# 17110009)

The Skykomish subbasin is located in north-central Puget Sound and contained in King and Snohomish counties, Washington. The subbasin contains five watersheds occupied by this ESU and these watersheds encompass approximately 853 mi² and 2,861 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 153 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified one historically independent population (Skykomish River) in this subbasin. Occupied reaches in two HUC5s (Tye and Beckler Rivers, and Skykomish River Forks) overlap with a FEMAT key watershed for at-risk anadromous salmonids (FEMAT 1994). The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A7 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Snoqualmie Subbasin (HUC4# 17110010)

The Snoqualmie subbasin is located in north-central Puget Sound and contained in King and Snohomish counties, Washington. The subbasin contains two watersheds occupied by this ESU and these watersheds encompass approximately 504 mi² and 1,525 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 84 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003).

Ruckelshaus et al. (2001, 2004) identified one historically independent population (Snoqualmie River) in this subbasin. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A8 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Snohomish Subbasin (HUC4# 17110011)

The Snohomish subbasin is located in north-central Puget Sound and contained entirely in Snohomish County, Washington. The subbasin contains two watersheds occupied by this ESU and these watersheds encompass approximately 278 mi² and 823 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 101 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003).

Ruckelshaus et al. (2001, 2004) identified two historically independent populations in this subbasin: Skykomish River and Snoqualmie River. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A9 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Lake Washington Subbasin (HUC4# 17110012)

The Lake Washington subbasin is located in south Puget Sound and contained in King and Snohomish counties, Washington. Lake Washington is a dominant feature in this subbasin. The subbasin contains four watersheds occupied by this ESU and these watersheds encompass approximately 619 mi² and 1,087 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 206 miles of occupied riverine/estuarine habitat in these watersheds. Lake Washington contains approximately 40 mi² of lake habitat in these watersheds. Ruckelshaus et al. (2001,

2004) identified two historically independent populations in this subbasin: Sammamish River and Cedar River. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. The CHART also determined that, based on a report by Tabor et al. (2004), low gradient reaches near the mouth of the Cedar River (Taylor Creek, Kenedydale Creek, and Johns Creek) were also occupied and contained PCEs for this ESU. The CHART determined that these streams as well as that portion of May Creek with gradients <2% were important occupied rearing areas for the Cedar River population of Chinook salmon. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A10 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Duwamish Subbasin (HUC4# 17110013)

The Duwamish subbasin is located in south Puget Sound and contained in King County, Washington. The subbasin contains three watersheds occupied by this ESU and these watersheds encompass approximately 487 mi² and 1,433 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 171 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified one historically independent population (Green River) in this subbasin. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A11 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Puyallup Subbasin (HUC4# 17110014)

The Puyallup subbasin is located in south Puget Sound and contained in King and Pierce counties, Washington. The subbasin contains five watersheds occupied by this ESU and these watersheds encompass approximately 996 mi² and 3,094 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 243 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified two historically independent populations in this subbasin: Puyallup River and White River. Occupied reaches in one HUC5 (Upper White River)

overlap with a FEMAT key watershed for at-risk anadromous salmonids (FEMAT 1994). The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A12 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Nisqually Subbasin (HUC4# 17110015)

The Nisqually subbasin is located in south Puget Sound and contained in Pierce, Thurston, and Lewis counties, Washington (although the latter is not occupied by this ESU). The subbasin contains two watersheds occupied by this ESU and these watersheds encompass approximately 472 mi² and 1,215 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 82 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified one historically independent population (Nisqually River) in this subbasin. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A13 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Deschutes Subbasin (HUC4# 17110016)

The Deschutes subbasin is located at the southern end of Puget Sound, and most of it is in Thurston County, Washington (although small portions of the subbasin – unoccupied by this ESU – also extend into Lewis County, Washington). The subbasin contains two watersheds occupied by this ESU and these encompass approximately 168 mi² and 529 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 54 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) did not identify any historically independent populations in this subbasin. The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or

migration PCEs, as well as management activities that may affect the PCEs in the watershed. Map A14 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Skokomish Subbasin (HUC4# 17110017)

The Skokomish subbasin is located at the southern end of Hood Canal, and most of it is in Mason County, Washington (although small portions of the subbasin – unoccupied by this ESU – also extend into Grays Harbor and Jefferson counties, Washington). The subbasin contains a single watershed (Skokomish River HUC5# - 1711001701) and encompasses approximately 248 mi² and 951 miles of streams. The Skokomish River population is the only population documented in this subbasin/watershed by Ruckelshaus et al. (2001, 2002, 2004). Fish distribution and habitat use data from WDFW identify approximately 72 miles of occupied riverine/estuarine habitat in the watershed (WDFW 2003). The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU, noted that this watershed contains the largest intact estuary in Hood Canal, and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watershed. Map A15 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Hood Canal Subbasin (HUC4# 17110018)

The Hood Canal subbasin includes most of the drainages of Hood Canal proper, including those of the western Kitsap Peninsula. The subbasin includes portions of the following Washington counties: Clallam, Jefferson, Kitsap, and Mason. The subbasin contains six watersheds occupied by this ESU and encompasses approximately 605 mi² and 2,766 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 58 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Occupied reaches in two HUC5s (Dosewallips River and Duckabush River) overlap with FEMAT key watersheds for at-risk anadromous salmonids (FEMAT 1994). The Mid-Hood Canal population is the only historically independent population documented in this subbasin by Ruckelshaus et al. (2001, 2002, 2004). The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A16 depicts the specific areas

in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Kitsap Subbasin (HUC4# 17110019)

The Kitsap subbasin includes drainages of eastern Kitsap Peninsula as well as small, frontal drainages of southern and eastern Puget Sound up to Whidbey Island. The subbasin includes portions of the following Washington counties: Island, Jefferson, King, Kitsap, Mason, Pierce, Snohomish, and Thurston counties. The subbasin contains four watersheds occupied by this ESU and these encompass approximately 721 mi² and 1,747 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 56 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). However, Ruckelshaus et al. (2001, 2004) did not identify any historically independent populations in this subbasin. The CHART concluded that nearly all of these occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Possible exceptions were streams in the Puget Sound/East Passage HUC5 (e.g., in Pipers Creek, north of Shilshole Bay) where the CHART questioned whether or not listed Chinook salmon occur in this watershed. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A17 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Dungeness/Elwha Subbasin (HUC4# 17110020)

The Dungeness/Elwha subbasin includes drainages to the eastern Strait of Juan de Fuca and includes portions of Clallam and Jefferson counties, Washington. The subbasin contains three occupied watersheds and encompasses approximately 695 mi² and 2,700 miles of streams. Ruckelshaus et al. (2001, 2004) identified the following historically independent populations in this subbasin: Dungeness River and Elwha River. Chinook salmon in the Port Angeles Harbor HUC5 are not currently assigned to a historically independent population for this ESU. Fish distribution and habitat use data from WDFW identify approximately 47 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Occupied reaches in one HUC5 (Dungeness River) overlap with a FEMAT key watershed for at-risk anadromous salmonids (FEMAT 1994). Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management

activities that may affect the PCEs in the watersheds. Map A18 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Marine Areas

In addition to the freshwater and estuarine areas described above, the CHART also evaluated nearshore marine areas for this ESU. In keeping with the watershed-based approach used for freshwater and estuarine habitat areas, the Team based their assessment on 19 nearshore zones corresponding to Washington’s Water Resource Inventory Areas (see Map A19). The nearshore marine area considered by the Team includes that zone from extreme high water out to a depth of 30 meters and adjacent to watersheds occupied by the ESU. The Team assessment focused on this area because it generally encompasses photic zone habitats supporting plant cover (e.g., eelgrass and kelp) important for rearing, migrating, and maturing Chinook salmon and their prey. Also, PCEs that may require special management considerations or protection are more readily identified in this zone (e.g., destruction of vegetative cover due to docks and bulkheads). Deeper waters are occupied by subadult and maturing fish, but it is unclear if these areas contain PCEs that require special management considerations or protection. The Team concluded that habitat areas in all 19 nearshore zones of Puget Sound (including areas adjacent to islands), Hood Canal, and the Strait of Juan de Fuca (to the mouth of the Elwha River) warrant a high rating for conservation value to the ESU. These habitat areas are found along approximately 2,376 miles of shoreline within the range of this ESU.

Changes to the CHART’s Initial Assessments

The CHART reviewed the public and peer reviewer comments received on the Team’s initial findings for this ESU as well as new information relevant to evaluating habitat areas for this ESU. As a result, the CHART did not change conservation value ratings for any watershed or nearshore zone within the geographical area occupied by this ESU, but did identify changes to the delineation of occupied habitat areas in several watersheds. The proposed critical habitat designation (69 FR 74572, December 14, 2004) summarizes the comments and responses pertaining to the CHART’s initial determinations for this ESU. And Tables A1 and A2 reflect the final CHART assessments, including the following changes in habitat area delineations:

Subbasin	Watershed code	Watershed/Area name	Changes from Initial CHART Assessment
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Nooksack	1711000402	Middle Fork Nooksack	Added 12 miles (19.2 km) of occupied habitat areas.
Stillaguamish	1711000802	South Fork Stillaguamish	Added 47 miles (75.6 km) of occupied habitat areas.
Snoqualmie	1711001004	Lower Snoqualmie River	Removed 6 miles (9.6 km) of unoccupied stream reaches.
Lake Washington	1711001201	Cedar River	Added 12 miles (19.2 km) of occupied habitat areas.

References and Sources of Information

References cited above as well as key reports and data sets reviewed by the CHART include the following:

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- Burton, K., L. Lowe, and H. Berge. 2005. Cedar River Chinook Salmon (*Oncorhynchus tshawytscha*) Redd and Carcass Surveys: Annual Report 2004. Available from Seattle Public Utilities, 700 5th Ave., Suite 4900, P.O. Box 34018, Seattle WA, 98124-4018)

- Correa, G. 2002. Salmon and Steelhead Habitat Limiting Factors; Water Resource Inventory Area 17; Quilcene-Snow Basin. Final Report to the Washington State Conservation Commission.
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Table A1. Summary of Occupied Areas, PCEs, and Management Activities Affecting PCEs for the Puget Sound Chinook Salmon ESU

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)				Unoccupied but may be essential** (mi)	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Estuarine and Nearshore Marine Shoreline (mi)		
	Strait of Georgia	Bellingham Bay	1711000201	4.4	0.8	6.0	0		C, I, U
	Strait of Georgia	Samish River	1711000202	16.2	4.3	20.4	0		A, C, U
	Strait of Georgia	Birch Bay	1711000204	5.5	0.0	13.7 ^a	0		F, U
	Nooksack	Upper North Fork Nooksack River	1711000401	15.9	4.4	5.8	0		F, R
	Nooksack	Middle Fork Nooksack River	1711000402	7.9	0.0	16.9	0		F, I, R
	Nooksack	South Fork Nooksack River	1711000403	35.8	1.5	10.7	0		C, F, R
	Nooksack	Lower North Fork Nooksack River	1711000404	52.5	<0.1	15.3	0		A, F, G
	Nooksack	Nooksack River	1711000405	46.2	20.5 ^b	34.1	0		A, C, F
	Upper Skagit	Skagit River/ Gorge Lake	1711000504	0.0	0.0	2.8	0		D, F, R
	Upper Skagit	Skagit River/ Diobsud Creek	1711000505	21.4	0.0	2.7	0		F, R
	Upper Skagit	Cascade River	1711000506	16.2	0.0	5.3	0		F
	Upper Skagit	Skagit River/ Illabot Creek	1711000507	32.9	0.0	1.1	0		F, R
	Upper Skagit	Baker River	1711000508	<0.1	0.0	22.4	0		D, F, R
	Sauk	Upper Sauk River	1711000601	25.9	1.1	0.2	0		F, R
	Sauk	Upper Suiattle River	1711000602	8.1	0.0	0.1	0		F, R
	Sauk	Lower Suiattle River	1711000603	25.5	8.4	3.5	0		F, R

^a A small portion of these PCEs in lower Dakota Creek overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N01.

^b A small portion of these PCEs in the lower Nooksack River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N01.

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)				Unoccupied but may be essential** (mi)	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Estuarine and Nearshore Marine Shoreline (mi)		
	Sauk	Lower Sauk River	1711000604	31.5	10.2	3.9	0		F
	Lower Skagit	Middle Skagit River/ Finney Creek	1711000701	59.7	1.2	25.1	0		A
	Lower Skagit	Lower Skagit River/ Nookachamps Creek	1711000702	1.3	35.9 ^c	26.1 ^d	0		A, C, W, U
	Stillaguamish	North Fork Stillaguamish River	1711000801	47.2	0.1	7.6	0		F, R
	Stillaguamish	South Fork Stillaguamish River	1711000802	71.0	1.5	9.9	0		F, R
	Stillaguamish	Lower Stillaguamish River	1711000803	24.0	0.8	16.6 ^e	0		F, U, W
	Skykomish	Tye And Beckler Rivers	1711000901	0.0	0.0	27.5	0		F, R
	Skykomish	Skykomish River Forks	1711000902	28.6	0.0	12.9	0		A, F, U
	Skykomish	Skykomish River/ Wallace River	1711000903	24.9	0.0	9.3	0		A, F
	Skykomish	Sultan River	1711000904	9.8	0.0	0.0	0		D, F, U
	Skykomish	Skykomish River/ Woods Creek	1711000905	24.5	0.0	15.0	0		A, F, G
	Snoqualmie	Middle Fork Snoqualmie River	1711001003	24.4	0.4	10.4	0		A, F
	Snoqualmie	Lower Snoqualmie River	1711001004	16.4	21.1	11.6	0		A, F
	Snohomish	Pilchuck River	1711001101	16.5	9.8	9.5	0		A, D, F, S

^c A small portion of these PCEs in the lower Skagit River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N03.

^d A small portion of these PCEs in the lower Skagit River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N03.

^e A small portion of these PCEs in the lower Stillaguamish River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N04.

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)				Unoccupied but may be essential** (mi)	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Estuarine and Nearshore Marine Shoreline (mi)		
	Snohomish	Snohomish River	1711001102	20.5 ^f	0.1	44.3 ^g	0		C, F, U
	Lake Washington	Cedar River	1711001201	34.8	1.0	1.6	0		C, D, F, I, U
	Lake Washington	Lake Sammamish	1711001202	23.5	1.0	12.2	0		F, U
	Lake Washington	Lake Washington	1711001203	5.7	4.9	57.0	0		F, U
	Lake Washington	Sammamish River	1711001204	54.7	0.5	8.7	0		F, U
	Duwamish	Upper Green River	1711001301	0.0	0.0	27.0	0		D, F
	Duwamish	Middle Green River	1711001302	12.1	0.0	31.3	0		A, D, U
	Duwamish	Lower Green River	1711001303	43.1	19.0	38.1	0		C, I, U
	Puyallup	Upper White River	1711001401	7.3	8.0	25.5	0		D, F, I
	Puyallup	Lower White River	1711001402	8.4	47.1	6.9	0		A, D, I, U
	Puyallup	Carbon River	1711001403	28.2	3.8	24.3	0		A, F
	Puyallup	Upper Puyallup River	1711001404	8.1	11.2	32.5	0		D, F
	Puyallup	Lower Puyallup River	1711001405	4.2	17.5 ^h	10.3	0		C, U
	Nisqually	Mashel/ Ohop	1711001502	32.9	4.7	1.3	0		A, D, U
	Nisqually	Lowland	1711001503	32.5	3.4 ⁱ	6.9 ^j	0		A, U
	Deschutes	Prairie1	1711001601	14.8	0.1	9.8	0		A, F, G
	Deschutes	Prairie2	1711001602	21.4	1.4	6.2 ^k	0		A, F, G

^f A small portion of these PCEs in lower Quilceda Creek overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N06.

^g A small portion of these PCEs in the lower Skykomish River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N06.

^h A small portion of these PCEs in the lower Puyallup River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N09.

ⁱ A small portion of these PCEs in lower McAllister Creek overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N10.

^j A small portion of these PCEs in the lower Nisqually River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N10.

^k A small portion of these PCEs in the lower Deschutes River and lower Indian Creek overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N12.

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)				Unoccupied but may be essential** (mi)	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Estuarine and Nearshore Marine Shoreline (mi)		
	Skokomish	Skokomish River	1711001701	37.7	3.7	30.5 ¹	0		C, D, F, U
	Hood Canal	Lower West Hood Canal Frontal	1711001802	0.7	0.1	0.5	0		C, F, R, U
	Hood Canal	Hamma Hamma River	1711001803	3.8	0.0	<0.1	0		C, F
	Hood Canal	Duckabush River	1711001804	6.4	0.1	1.6	0		C, F
	Hood Canal	Dosewallips River	1711001805	13.0	0.5	0.3	0		C, F, R
	Hood Canal	Big Quilcene River	1711001806	2.2	0.5	0.2	0		C, F
	Hood Canal	West Kitsap	1711001808	21.9	3.1	4.5	0		A, F, U
	Kitsap	Kennedy/ Goldsborough	1711001900	0.0	0.0	12.1	0		A, F, U
	Kitsap	Puget	1711001901	8.4	0.3	19.2	0		A, G, U
	Kitsap	Prairie3	1711001902	0.0	0.0	14.5 ^m	0		G, U
	Kitsap	Puget Sound/ East Passage	1711001904	0.0	0.0	1.2	0		C, U
	Dungeness/ Elwha	Dungeness River	1711002003	30.2	0.1	1.2	0		C, F, I, R, S, U
	Dungeness/ Elwha	Port Angeles Harbor	1711002004	4.7	0.0	4.8	0		F, U
	Dungeness/ Elwha	Elwha River	1711002007	5.1 ⁿ	1.2	<0.1	0	45.4 ^o	D, F
		Nearshore Marine Area	N01	0	0	0	154.9		C, H, U
		Nearshore Marine Area	N02	0	0	0	407.9		C, H, T
		Nearshore Marine Area	N03	0	0	0	225.2		C, H, T
		Nearshore Marine Area	N04	0	0	0	36		C, H
		Nearshore Marine Area	N05	0	0	0	212.5		C, H, T, U

¹ A small portion of these PCEs in the lower Skokomish River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N17.

^m A small portion of these PCEs in lower Mclane Creek and lower Woodland Creek overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N12.

ⁿ A small portion of these PCEs in the lower Elwha River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N19.

^o Watershed contains unoccupied habitat above Elwha and Glines Canyon dams that may be essential for conservation.

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)				Unoccupied but may be essential** (mi)	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Estuarine and Nearshore Marine Shoreline (mi)		
		Nearshore Marine Area	N06	0	0	0	77.7		C, H, T
		Nearshore Marine Area	N07	0	0	0	38.1		C, H, T
		Nearshore Marine Area	N08	0	0	0	45.1		C, H, T
		Nearshore Marine Area	N09	0	0	0	36.4		C, H, T
		Nearshore Marine Area	N10	0	0	0	10.5		C, H
		Nearshore Marine Area	N11	0	0	0	29.7		C, H, T, U
		Nearshore Marine Area	N12	0	0	0	77.5		C, H
		Nearshore Marine Area	N13	0	0	0	174		C, H
		Nearshore Marine Area	N14	0	0	0	419.1		C, H, T, U
		Nearshore Marine Area	N15	0	0	0	101.8		C, H, T, U
		Nearshore Marine Area	N16	0	0	0	16.3		C, H
		Nearshore Marine Area	N17	0	0	0	45.1		C, H, S
		Nearshore Marine Area	N18	0	0	0	213.5		C, H, T
		Nearshore Marine Area	N19	0	0	0	55.2		C, H

* Some streams classified as “Migration/ Presence PCEs” may also include rearing or spawning PCEs, but the GIS data are still undergoing review to confirm additional habitat use types.

** These watersheds contain unoccupied habitat that historically supported spawning and rearing PCEs. The CHART determined that these habitat areas/watersheds may be essential for conservation of the ESU.

*** This list is not exhaustive. It is intended to highlight key management activities affecting PCEs in each watershed. Activities identified are based on the general categories described by Spence et al. (1996) and summarized previously in the “Special Management Considerations or Protection” section of this report. Coding is as follows: F= forestry, G = grazing, A = agriculture, C = channel/bank modifications such as boat ramps, bulkheads, rip rap, diking and/or dredging, R = road building/maintenance, U = urbanization, S = sand and gravel mining, M = mineral mining, D = hydroelectric dams, I = irrigation impoundments and withdrawals, T = river, estuary, and ocean traffic, W = wetland loss/removal, B = beaver removal, X = exotic/invasive species introductions, H = forage fish/species harvest. Primary sources for this information were the CHART and reports by Berry et al (2001), Kerwin (1999a), Kerwin (1999b), WSCC (1999), WSCC (2000), Kerwin (2001), Beamer et al. (2000), Washington State Department of Natural Resources (2001), Haring (2002), Smith (2002), Kuttel (2003), and Fresh et al. (2004).

Table A2. Summary of CHART Scores and Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Puget Sound Chinook Salmon ESU

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Strait of Georgia	Bellingham Bay	1711000201	0	1	1	1	1	0	4	Low HUC5 score; not identified as supporting a historically independent population	Low
	Strait of Georgia	Samish River	1711000202	1	1	2	1	1	1	7	Moderate HUC5 score; not identified as supporting a historically independent population; lost connectivity to Skagit River system a key CHART concern for this HUC5	Low
	Strait of Georgia	Birch Bay	1711000204	1	1	1	1	1	0	5	Low HUC5 score; not identified as supporting a historically independent population	Low
	Nooksack	Upper North Fork Nooksack River	1711000401	2	1	2	3	2	3	13	High HUC5 score; PCEs support one of only two populations in the North Sound region; PCEs in FEMAT key watershed	High
	Nooksack	Middle Fork Nooksack River	1711000402	1	1	2	2	1	2	9	Moderate HUC5 score; PCEs support one of only two populations in the North Sound region; PCEs are more limited in this HUC5 relative to other HUC5s in this region	Medium
	Nooksack	South Fork Nooksack River	1711000403	3	1	2	3	2	3	14	High HUC5 score; PCEs support one of only two populations in the North Sound region	High
	Nooksack	Lower North Fork Nooksack River	1711000404	3	1	2	3	2	3	14	High HUC5 score; PCEs support both populations in the North Sound region	High
	Nooksack	Nooksack River	1711000405	3	1	2	3	2	3	14	High HUC5 score; PCEs support both populations in the North Sound region	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Skagit	Skagit River/Gorge Lake	1711000504	1	3	3	3	3	3	16	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Upper Skagit	Skagit River/ Diobsud Creek	1711000505	2	2	3	3	3	3	16	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Upper Skagit	Cascade River	1711000506	2	3	3	3	2	3	16	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Upper Skagit	Skagit River/Illabot Creek	1711000507	3	2	3	3	3	3	17	High HUC5 score; PCEs support six of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Upper Skagit	Baker River	1711000508	1	1	1	2	1	3	9	Moderate HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU; PCEs are much more limited in this HUC5 (due to dams) relative to other HUC5s in this region	Medium
	Sauk	Upper Sauk River	1711000601	3	3	3	3	2	3	17	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU; PCEs in FEMAT key watershed	High
	Sauk	Upper Suiattle River	1711000602	3	2	1	3	2	3	14	High HUC5 score; PCEs support two of ten populations in the Central Sound region which is the primary production region for this ESU; PCEs in FEMAT key watershed	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Sauk	Lower Suiattle River	1711000603	3	2	1	3	2	3	14	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU; PCEs in FEMAT key watershed	High
	Sauk	Lower Sauk River	1711000604	3	2	1	3	2	3	14	High HUC5 score; PCEs support three of ten populations in the Central Sound region which is the primary production region for this ESU; PCEs in FEMAT key watershed	High
	Lower Skagit	Middle Skagit River/Finney Creek	1711000701	3	2	3	3	3	3	17	High HUC5 score; PCEs support six of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Lower Skagit	Lower Skagit River/ Nookachamps Creek	1711000702	3	1	2	3	3	3	15	High HUC5 score; PCEs support six of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Stillaguamish	North Fork Stillaguamish River	1711000801	1	1	2	3	2	3	12	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Stillaguamish	South Fork Stillaguamish River	1711000802	2	2	1	2	2	2	11	High HUC5 score; PCEs support two of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Stillaguamish	Lower Stillaguamish River	1711000803	2	1	2	3	2	3	13	High HUC5 score; PCEs support two of ten populations in the Central Sound region which is the primary production region for this ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Skykomish	Tye And Beckler Rivers	1711000901	2	3	3	3	2	3	16	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU; PCEs in FEMAT key watershed	High
	Skykomish	Skykomish River Forks	1711000902	2	3	1	3	2	3	14	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU; PCEs in FEMAT key watershed	High
	Skykomish	Skykomish River/Wallace River	1711000903	2	2	2	3	2	3	14	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Skykomish	Sultan River	1711000904	1	2	3	3	2	2	13	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Skykomish	Skykomish River/Woods Creek	1711000905	2	2	2	3	2	3	14	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Snoqualmie	Middle Fork Snoqualmie River	1711001003	2	2	1	3	2	3	13	High HUC5 score; PCEs support two of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Snoqualmie	Lower Snoqualmie River	1711001004	3	2	2	3	2	3	15	High HUC5 score; PCEs support two of ten populations in the Central Sound region which is the primary production region for this ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Snohomish	Pilchuck River	1711001101	1	1	2	1	2	2	9	Moderate HUC5 score; PCEs are more limited in this HUC5 relative to other HUC5s in this region	Medium
	Snohomish	Snohomish River	1711001102	2	2	2	3	2	3	14	High HUC5 score; PCEs support two of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Lake Washington	Cedar River	1711001201	2	2	1	1	1	2	9	Moderate HUC5 score but PCEs support entire spawning range for the Cedar River population.	High
	Lake Washington	Lake Sammamish	1711001202	2	2	1	0	1	2	8	Moderate HUC5 score; PCEs supporting spawning for the Sammamish River population are found in two HUC5s	Medium
	Lake Washington	Lake Washington	1711001203	1	1	1	2	1	2	8	Moderate HUC5 score; supports two populations in this region	Medium
	Lake Washington	Sammamish River	1711001204	1	1	1	1	1	2	7	Moderate HUC5 score; PCEs supporting spawning for the Sammamish River population are found in two HUC5s	Medium
	Duwamish	Upper Green River	1711001301	1	1	2	0	1	2	7	Moderate HUC5 score; PCEs support fish that are trapped and hauled into this HUC5; PCEs in downstream (and naturally accessible) HUC5s likely to be of higher conservation value for the Green/Duwamish River population	Medium
	Duwamish	Middle Green River	1711001302	1	2	1	2	2	2	10	Moderate HUC5 score; PCEs support one of six populations in the South Sound region for this ESU; this HUC5 likely to be emphasized for access above Howard Hanson Dam	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Duwamish	Lower Green River	1711001303	3	1	1	1	2	2	10	Moderate HUC5 score; PCEs support one of six populations in the South Sound region for this ESU; PCEs may be most abundant in this HUC5 relative to other HUC5s in this region of the ESU	High
	Puyallup	Upper White River	1711001401	3	2	2	3	2	3	15	High HUC5 score; PCEs support one of six populations in the South Sound region for this ESU	High
	Puyallup	Lower White River	1711001402	3	1	2	3	2	3	14	High HUC5 score; PCEs support one of six populations in the South Sound region for this ESU	High
	Puyallup	Carbon River	1711001403	2	2	2	2	2	3	13	High HUC5 score; PCEs support one of six populations in the South Sound region for this ESU	High
	Puyallup	Upper Puyallup River	1711001404	2	1	2	3	2	3	13	High HUC5 score; PCEs support one of six populations in the South Sound region for this ESU	High
	Puyallup	Lower Puyallup River	1711001405	1	0	2	3	2	3	11	Moderate HUC5 score but PCEs support two of six populations in the South Sound region for this ESU	High
	Nisqually	Mashel/Ohop	1711001502	1	1	2	2	2	2	10	Moderate HUC5 score; important and diverse habitat types (including different ecoregion – southern Puget prairies – from other populations); PCEs support one of six populations in the South Sound region for this ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Nisqually	Lowland	1711001503	2	2	1	2	2	2	11	Moderate HUC5 score; important and diverse habitat types (including different ecoregion – southern Puget prairies – from other populations); PCEs support one of six populations in the South Sound region for this ESU	High
	Deschutes	Prairie1	1711001601	1	1	1	0	0	1	4	Low HUC5 score; not identified as supporting a historically independent population	Low
	Deschutes	Prairie2	1711001602	1	1	1	0	0	1	4	Low HUC5 score; not identified as supporting a historically independent population	Low
	Skokomish	Skokomish River	1711001701	1	1	2	2	2	3	11	PCEs support one of two historically independent populations identified in Hood Canal region; largest intact estuary in Hood Canal; PCEs in FEMAT key watershed	High
	Hood Canal	Lower West Hood Canal Frontal	1711001802	0	0	0	0	0	0	0	Lowest possible HUC5 score; not identified as supporting a historically independent population; CHART questioned ESU presence here	Low
	Hood Canal	Hamma Hamma River	1711001803	0	1	1	0	1	2	5	Moderate score for a HUC5 in a region that only contains two historically independent populations; more limited distribution here than Duckabush and Dosewallip Rivers	Medium
	Hood Canal	Duckabush River	1711001804	1	1	2	1	1	2	8	Relatively high score for a HUC5 in a region that only contains two historically independent populations; PCEs in FEMAT key watershed	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Hood Canal	Dosewallips River	1711001805	1	2	1	1	1	2	8	Relatively high score for a HUC5; PCEs support one of two historically independent populations identified in Hood Canal region; PCEs in FEMAT key watershed	High
	Hood Canal	Big Quilcene River	1711001806	1	1	1	0	0	1	4	Low HUC5 score; not identified as supporting a historically independent population; CHART questioned ESU presence here	Low
	Hood Canal	West Kitsap	1711001808	1	1	1	0	0	1	4	Low HUC5 score; not identified as supporting a historically independent population	Low
	Kitsap	Kennedy/ Goldsborough	1711001900	0	2	1	0	0	1	4	Low HUC5 score; not identified as supporting a historically independent population; other larger subbasins in this region are likely of greater conservation value to this ESU	Low
	Kitsap	Puget	1711001901	0	0	1	0	0	1	2	Low HUC5 score; not identified as supporting a historically independent population; other larger subbasins in this region are likely of greater conservation value to this ESU	Low
	Kitsap	Prairie3	1711001902	0	1	1	0	0	1	3	Low HUC5 score; not identified as supporting a historically independent population; other larger subbasins in this region are likely of greater conservation value to this ESU	Low

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Kitsap	Puget Sound/East Passage	1711001904	0	0	0	0	0	0	0	Lowest possible HUC5 score; not identified as supporting a historically independent population; other larger subbasins in this region are likely of greater conservation value to this ESU. Also, CHART questioned ESU presence here	Low
	Dungeness/ Elwha	Dungeness River	1711002003	2	1	2	3	2	3	13	High HUC5 score; supports one of only two extant populations in the Strait of Juan de Fuca region; PCEs in FEMAT key watershed	High
	Dungeness/ Elwha	Port Angeles Harbor	1711002004	1	1	1	1	0	1	5	Low HUC5 score; not identified as supporting a historically independent population; however only one of three occupied HUC5s in the Strait of Juan de Fuca region	Medium
	Dungeness/ Elwha	Elwha River	1711002007	1	1	2	3	2	3	12	High HUC5 score; supports one of only two extant populations in the Strait of Juan de Fuca region. Watershed contains unoccupied habitat above Elwha and Glines Canyon dams that may be essential for conservation.	High
	NA	Nearshore Marine Area	N01							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N02							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High

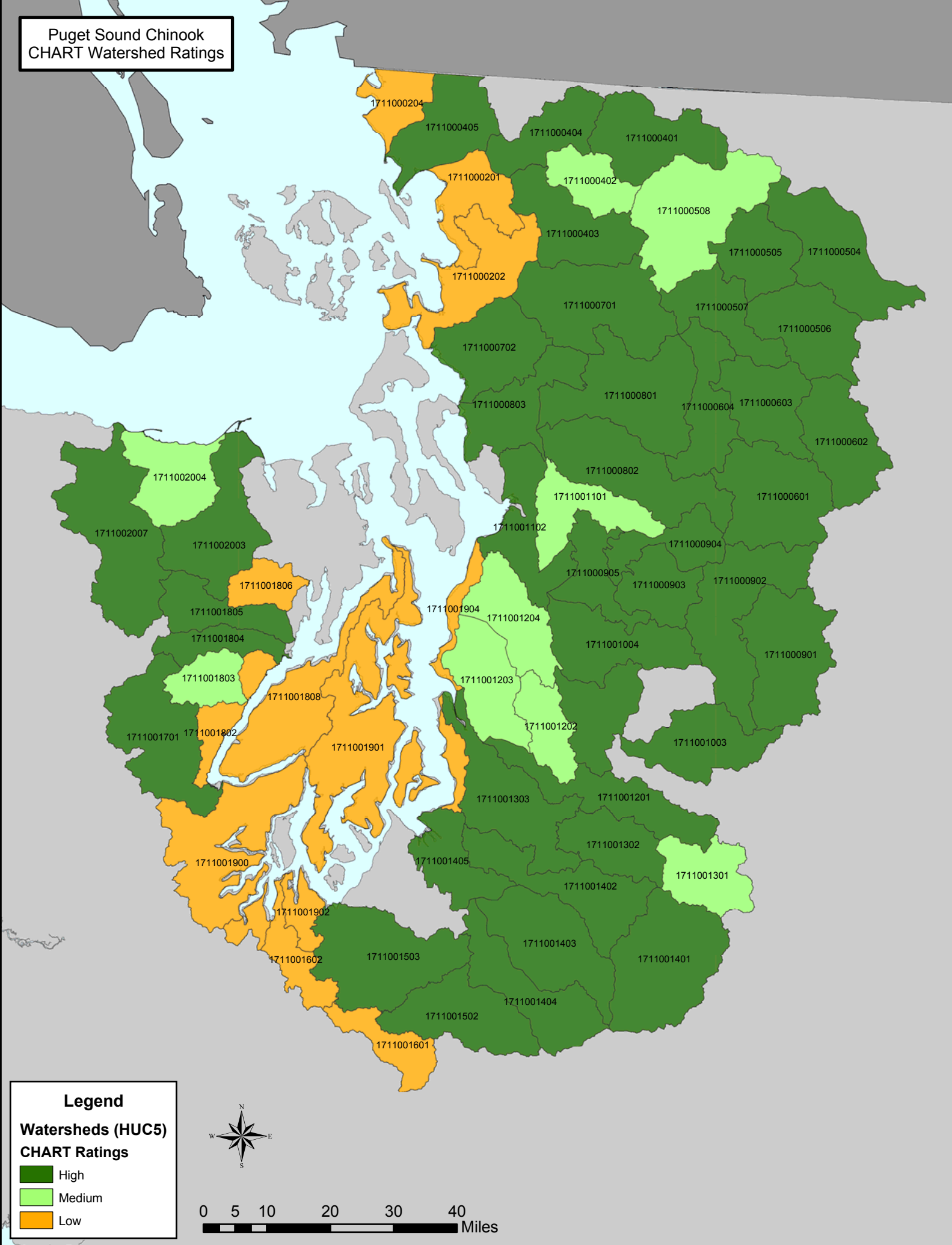
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	NA	Nearshore Marine Area	N03							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N04							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N05							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N06							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N07							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N08							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N09							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	NA	Nearshore Marine Area	N10							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N11							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N12							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N13							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N14							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N15							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N16							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	NA	Nearshore Marine Area	N17							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N18							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N19							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High

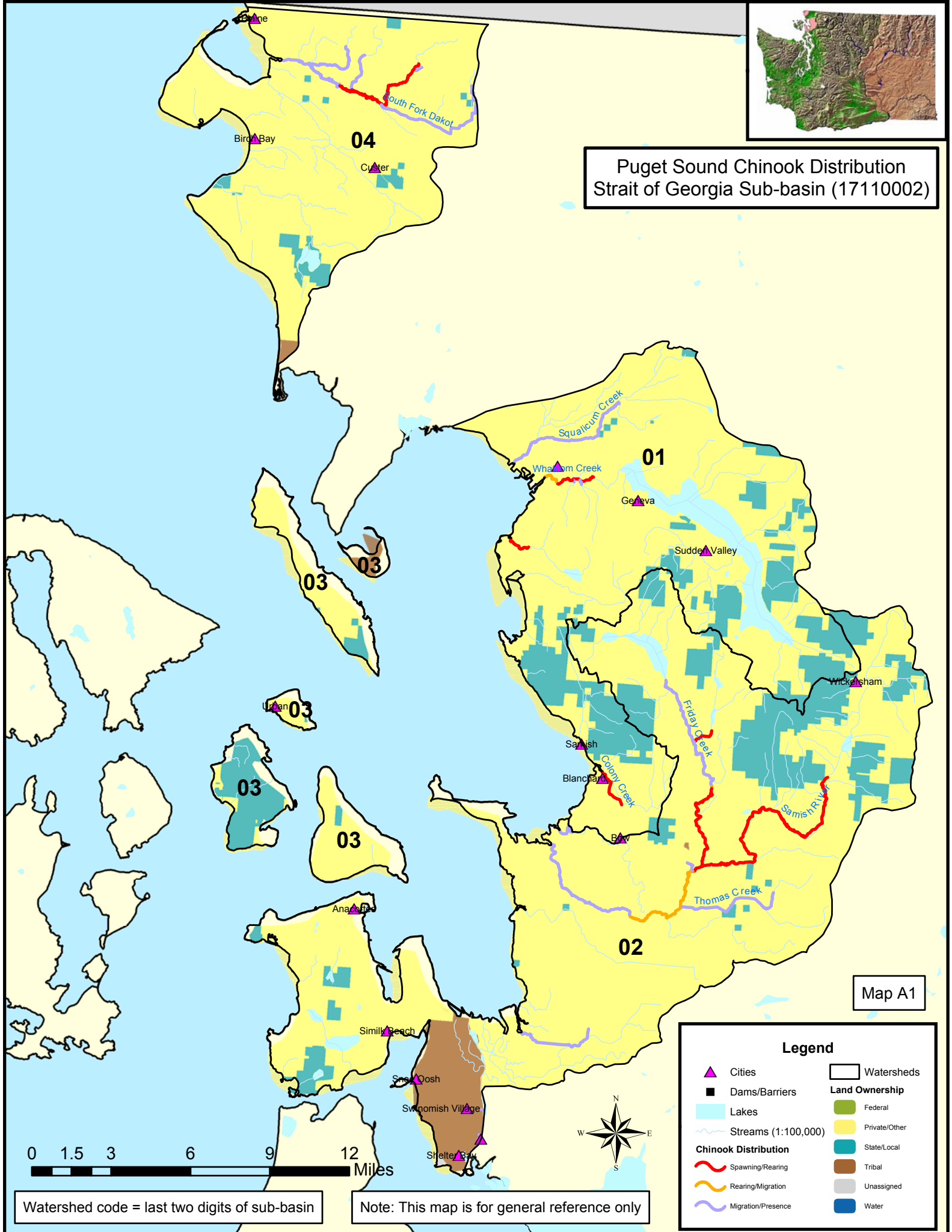
Figure A1. CHART Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Puget Sound Chinook Salmon ESU

Puget Sound Chinook
CHART Watershed Ratings





Puget Sound Chinook Distribution
Strait of Georgia Sub-basin (17110002)

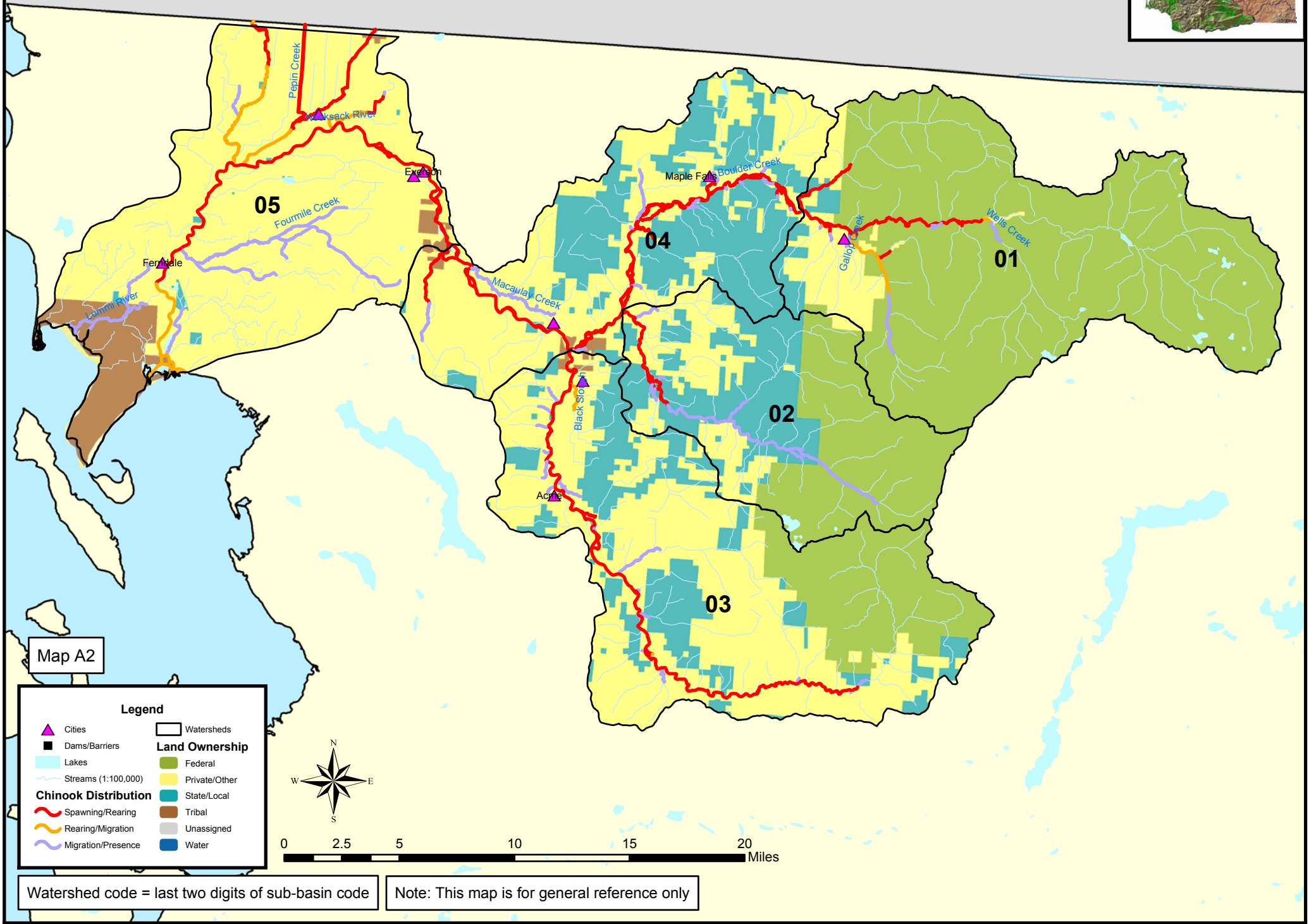


Map A1

Legend

Cities	Dams/Barriers	Watersheds
Lakes	Land Ownership: Federal	Land Ownership: Private/Other
Streams (1:100,000)	Land Ownership: State/Local	Land Ownership: Tribal
Chinook Distribution: Spawning/Rearing	Land Ownership: Unassigned	Land Ownership: Water
Chinook Distribution: Rearing/Migration		
Chinook Distribution: Migration/Presence		

Puget Sound Chinook Distribution Nooksack Sub-basin (17110004)



Map A2

Legend

- Cities
- Dams/Barriers
- Lakes
- Streams (1:100,000)
- Chinook Distribution**
 - Spawning/Rearing
 - Rearing/Migration
 - Migration/Presence

Land Ownership

- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

Watersheds

Watershed code = last two digits of sub-basin code

Note: This map is for general reference only

Puget Sound Distribution
Upper Skagit Sub-basin (17110005)



Map A3

Legend

▲ Cities

■ Dams/Barriers

~ Streams (1:100,000)

Chinook Distribution

— Spawning/Rearing

— Rearing/Migration

— Migration/Presence

□ Watersheds

Land Ownership

■ Federal

■ Private/Other

■ State/Local

■ Tribal

■ Unassigned

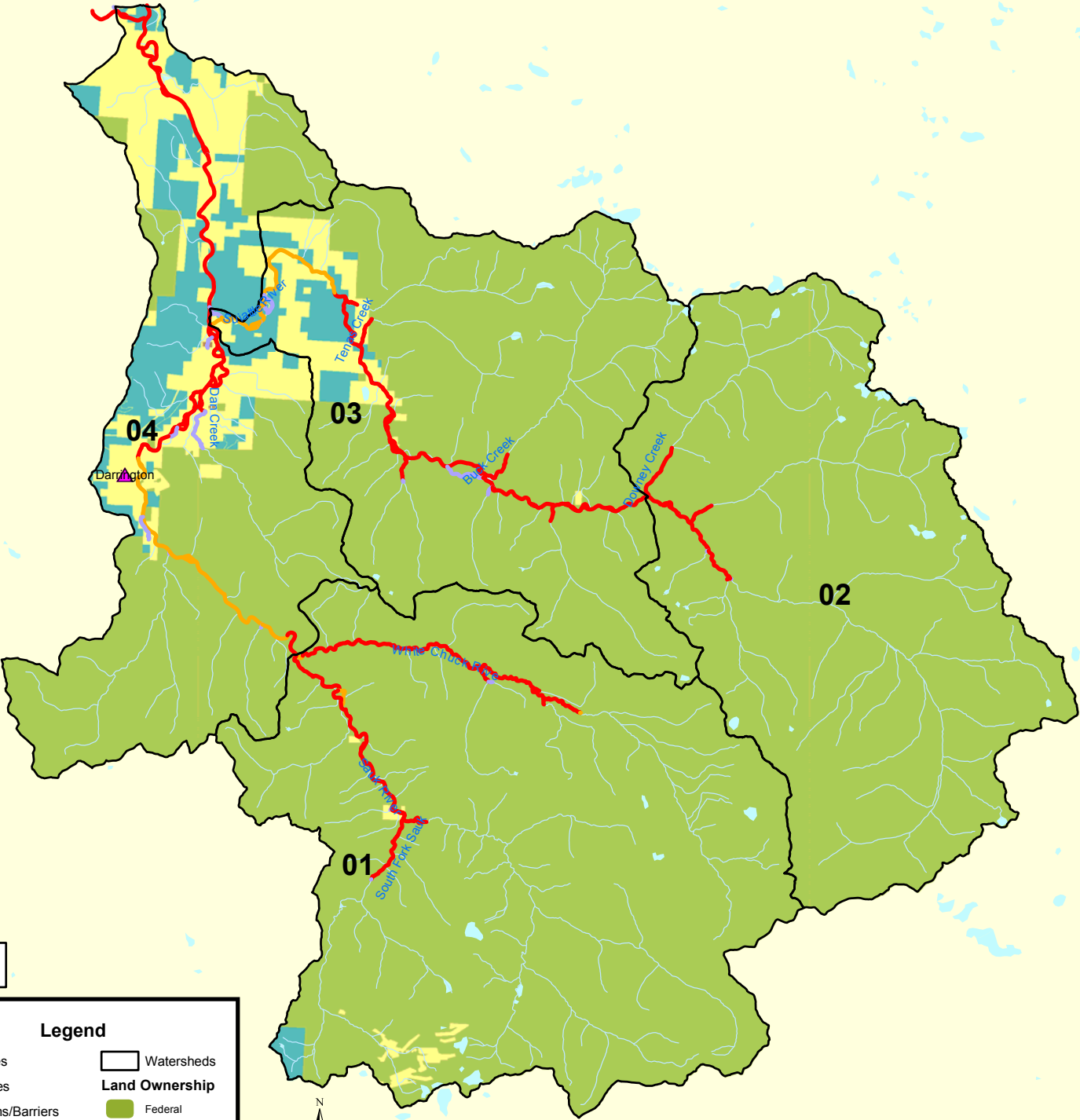
■ Water

Watershed code = last two digits of sub-basin code

Note: This map is for general reference only



Puget Sound Chinook Distribution
Sauk Sub-basin (17110006)



Map A4

Legend

▲ Cities

■ Dams/Barriers

Streams (1:100,000)

Chinook Distribution

— Spawning/Rearing

— Rearing/Migration

— Migration/Presence

Watersheds

Land Ownership

■ Federal

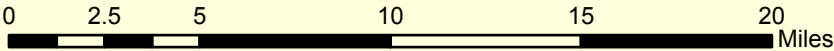
■ Private/Other

■ State/Local

■ Tribal

■ Unassigned

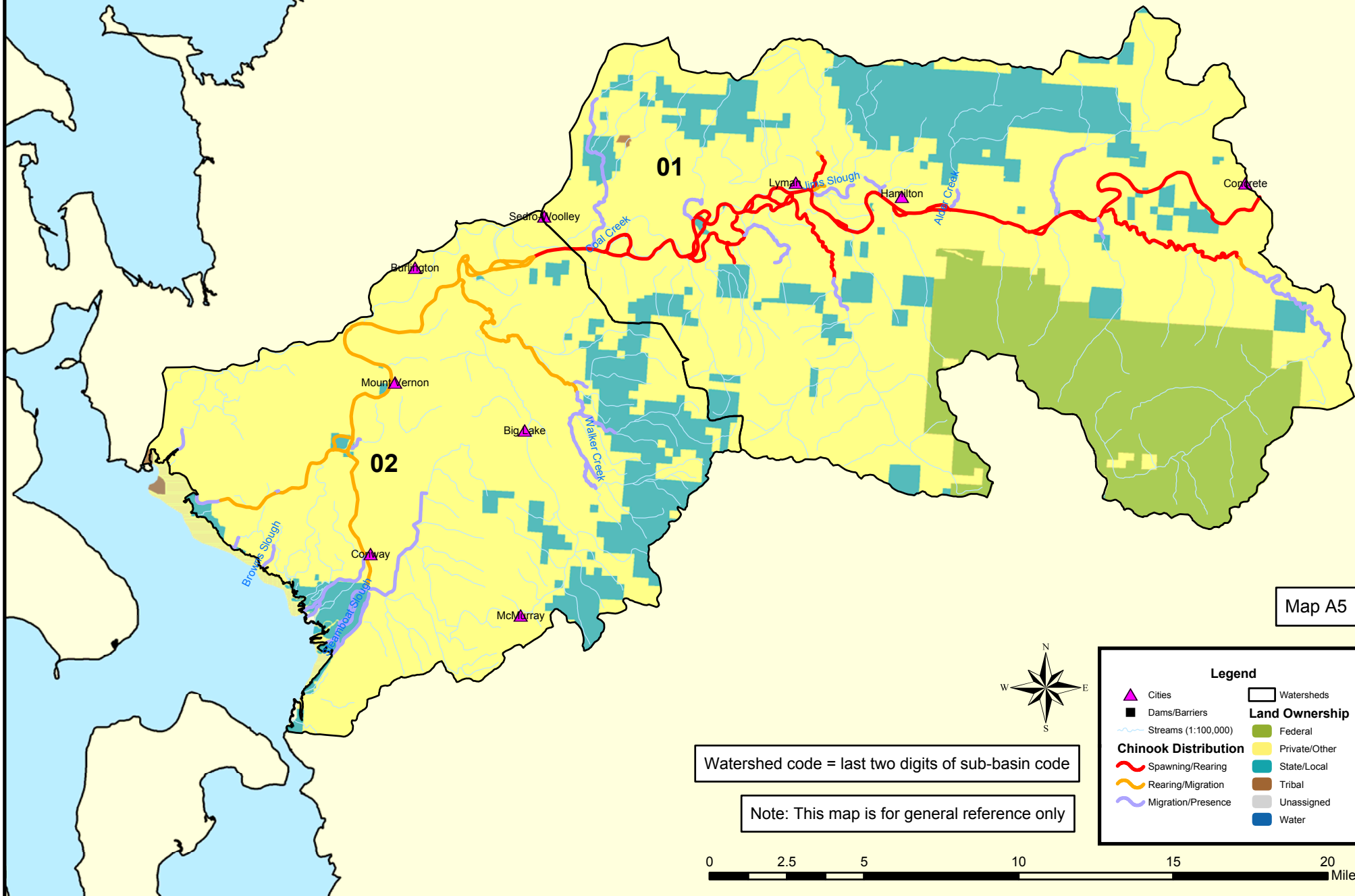
■ Water



Watershed code = last two digits of sub-basin code

Note: This map is for general reference only

Puget Sound Chinook Distribution
Lower Skagit Sub-basin (17110007)



Map A5

Watershed code = last two digits of sub-basin code

Note: This map is for general reference only

Legend

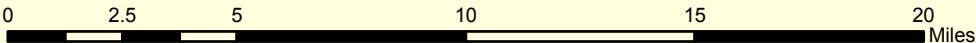
Cities
 Dams/Barriers
 Streams (1:100,000)

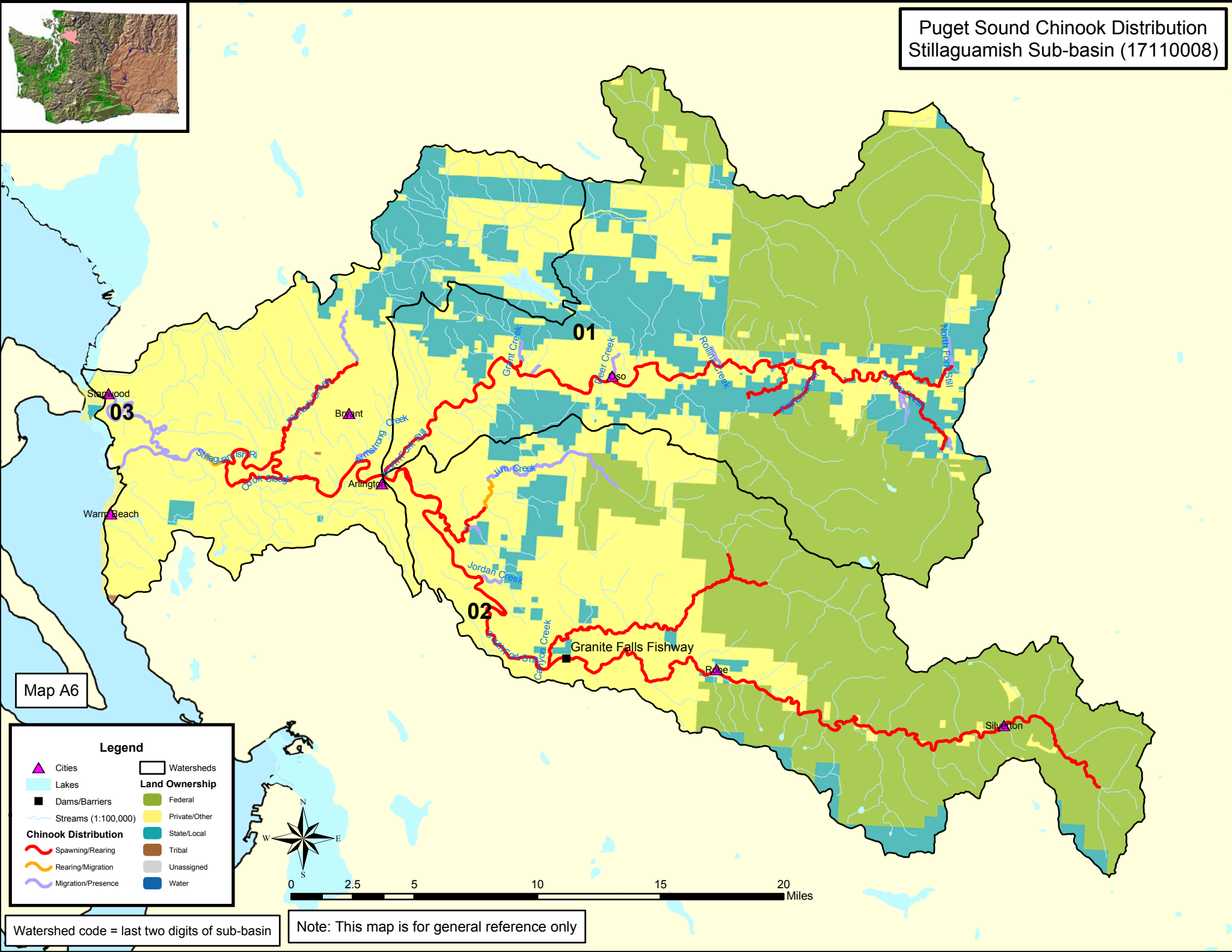
Spawning/Rearing
 Rearing/Migration
 Migration/Presence

Land Ownership

Federal
 Private/Other
 State/Local
 Tribal
 Unassigned
 Water

Watersheds





Map A6

Legend

Cities

Lakes

Dams/Barriers

Streams (1:100,000)

Chinook Distribution

Spawning/Rearing

Rearing/Migration

Migration/Presence

Watersheds

Land Ownership

Federal

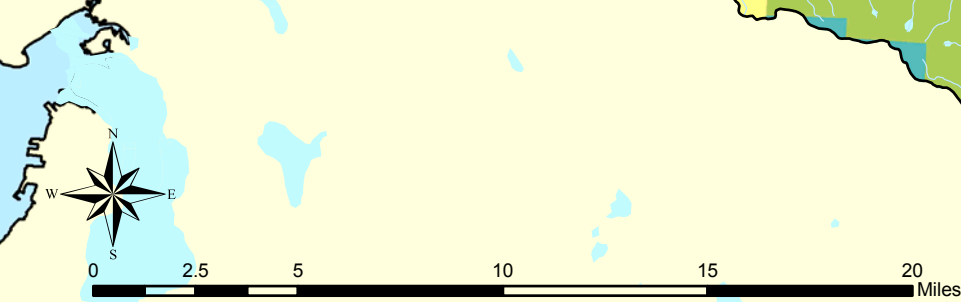
Private/Other

State/Local

Tribal

Unassigned

Water

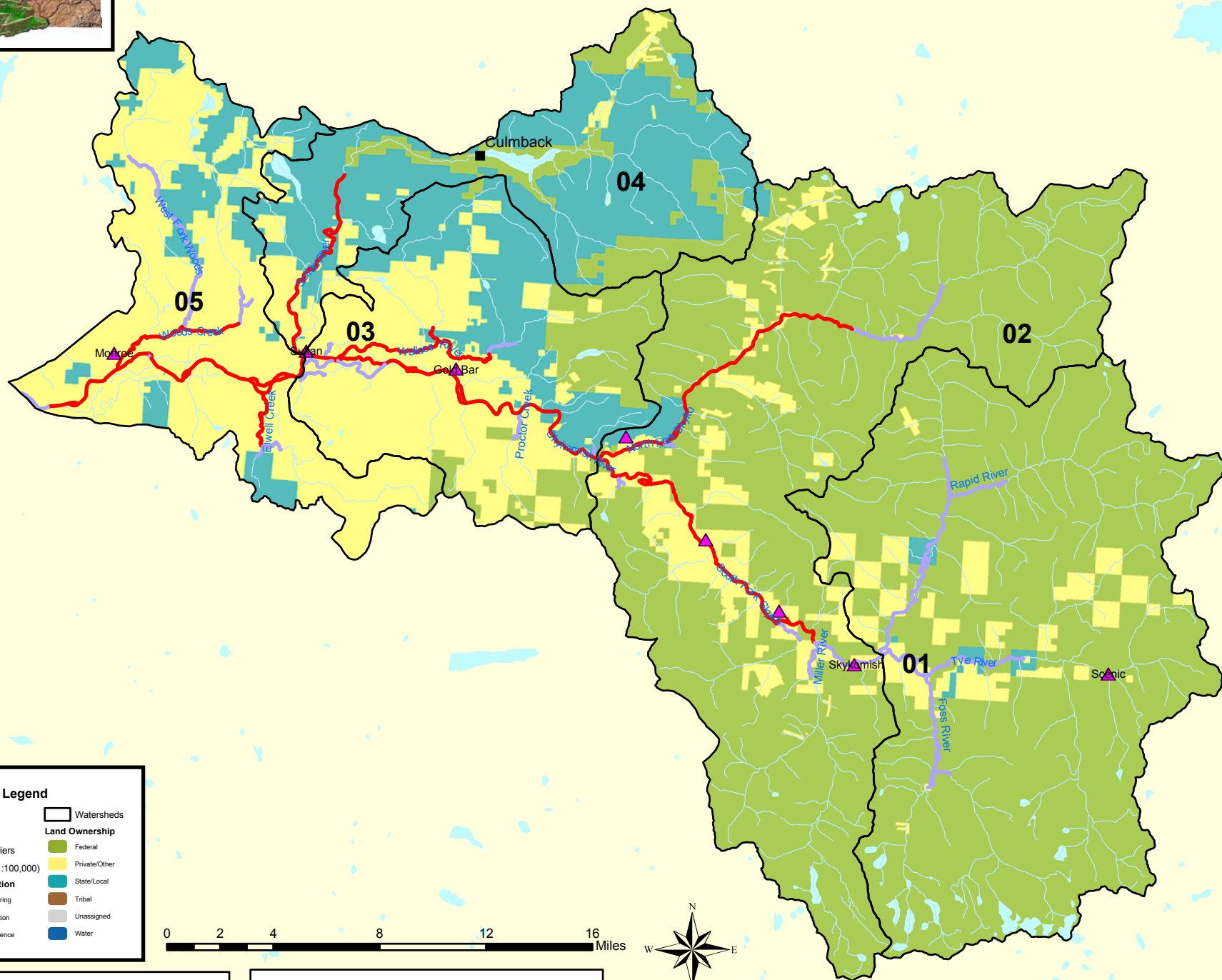


Watershed code = last two digits of sub-basin

Note: This map is for general reference only



Puget Sound Chinook Distribution
Skykomish Sub-basin (17110009)



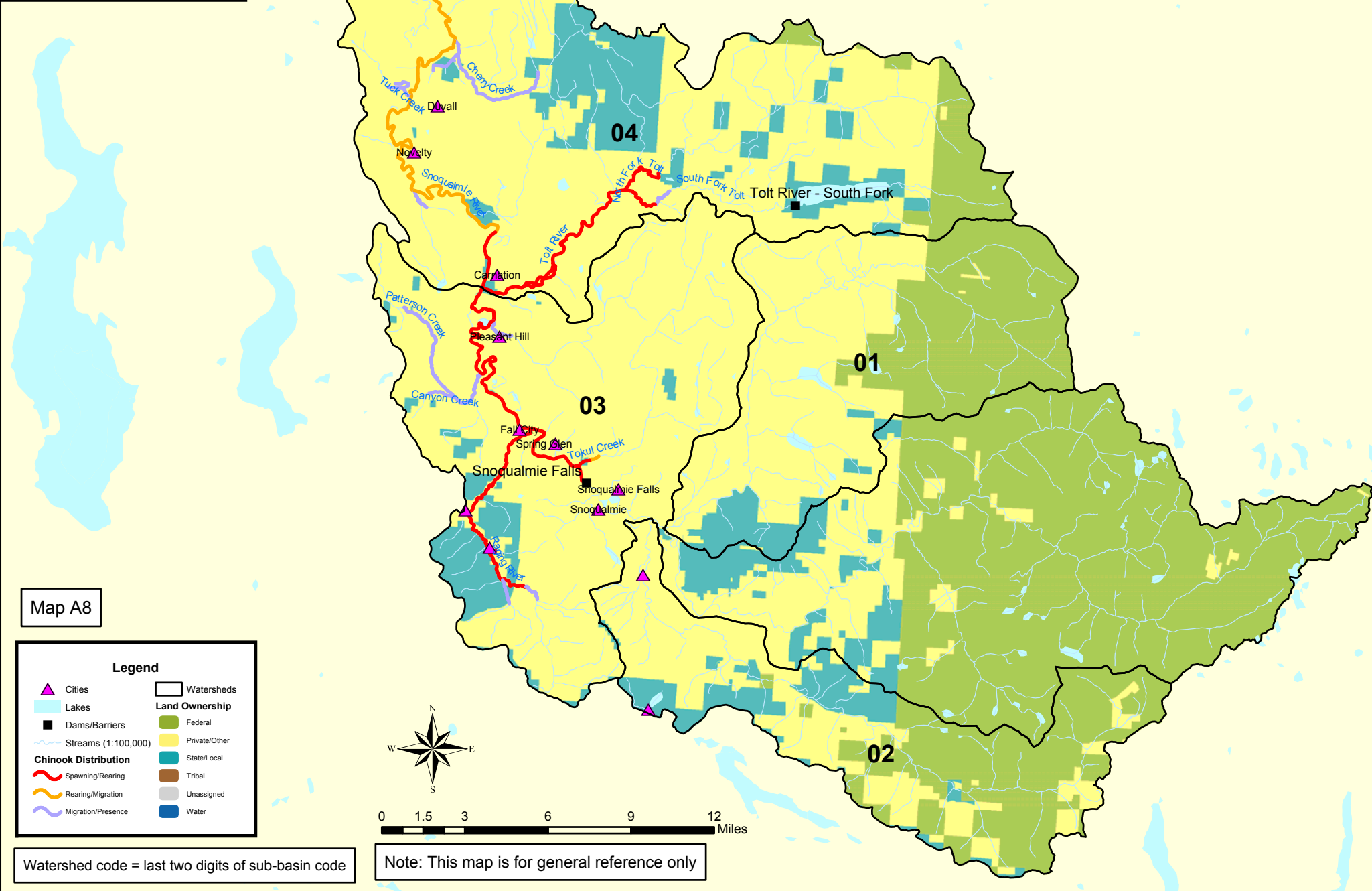
Map A7

Legend

Cities	Watersheds
Lakes	Land Ownership
Dams/Barriers	Federal
Streams (1:100,000)	Private/Other
Chinook Distribution	State/Local
Spawning/Rearing	Tribal
Rearing/Migration	Unassigned
Migration/Presence	Water

Watershed code = last two digits of sub-basin

Note: This map is for general reference only



Map A8

Legend

Cities	Watersheds
Lakes	Land Ownership
Dams/Barriers	Federal
Streams (1:100,000)	Private/Other
Chinook Distribution	State/Local
Spawning/Rearing	Tribal
Rearing/Migration	Unassigned
Migration/Presence	Water

Watershed code = last two digits of sub-basin code

Note: This map is for general reference only

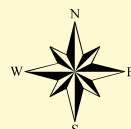
Puget Sound Chinook Snohomish Sub-basin (17110011)



Map A9

Legend

- | | |
|-----------------------------|-----------------------|
| Cities | Watersheds |
| Lakes | Land Ownership |
| Dams/Barriers | Federal |
| Streams (1:100,000) | Private/Other |
| Chinook Distribution | State/Local |
| Spawning/Rearing | Tribal |
| Rearing/Migration | Unassigned |
| Migration/Presence | Water |

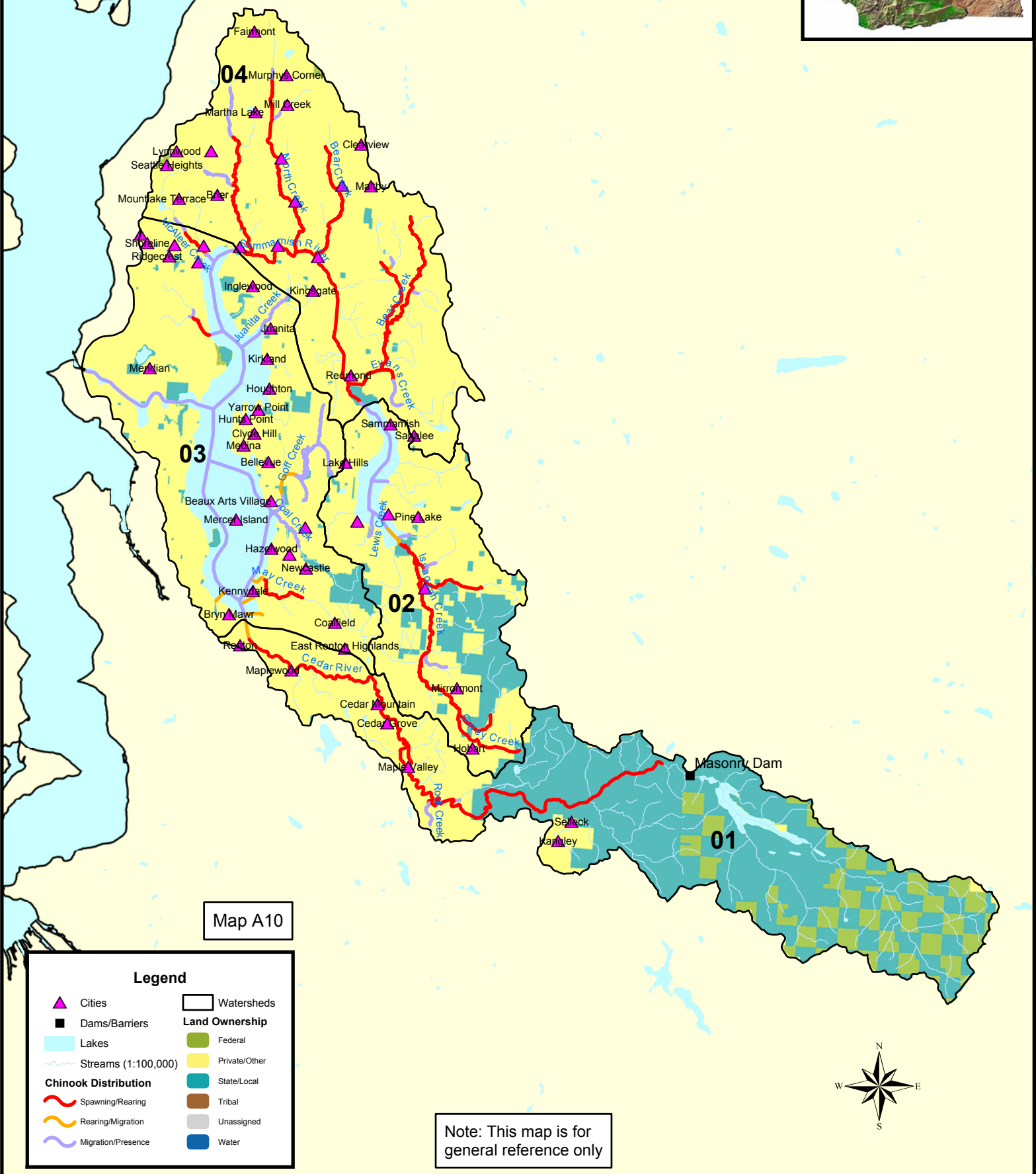
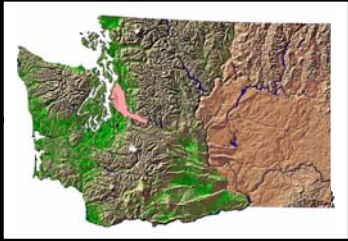


0 1.5 3 6 9 12 Miles

Watershed code = last two digits of sub-basin code

Note: This map is for general reference only

Puget Sound Chinook Distribution Lake Washington Sub-basin (17110012)



Map A10

Legend

- Cities
- Dams/Barriers
- Lakes
- Streams (1:100,000)
- Chinook Distribution**
 - Spawning/Rearing
 - Rearing/Migration
 - Migration/Presence

Land Ownership

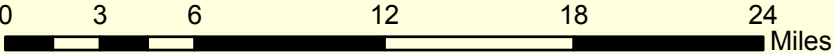
- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

Watersheds

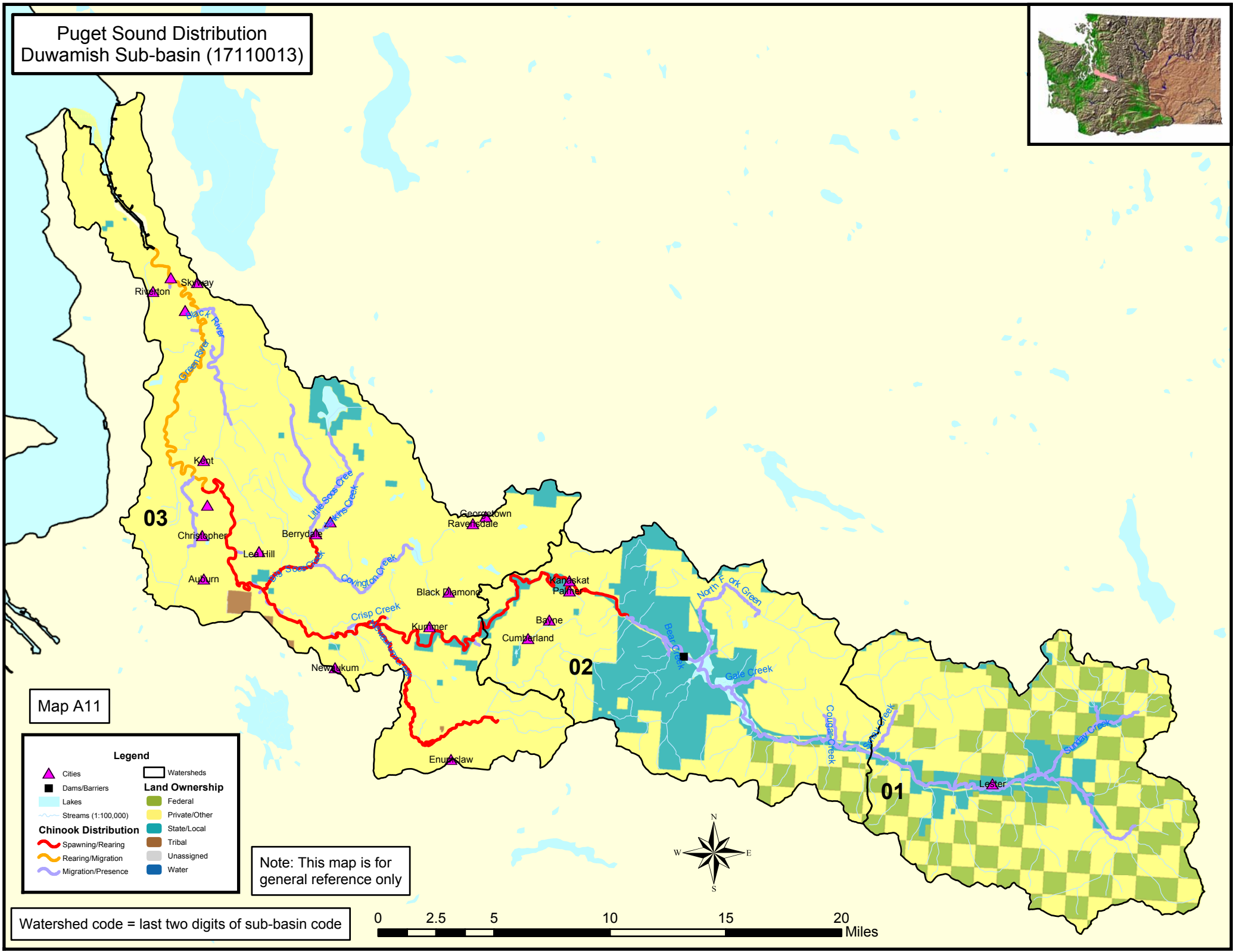
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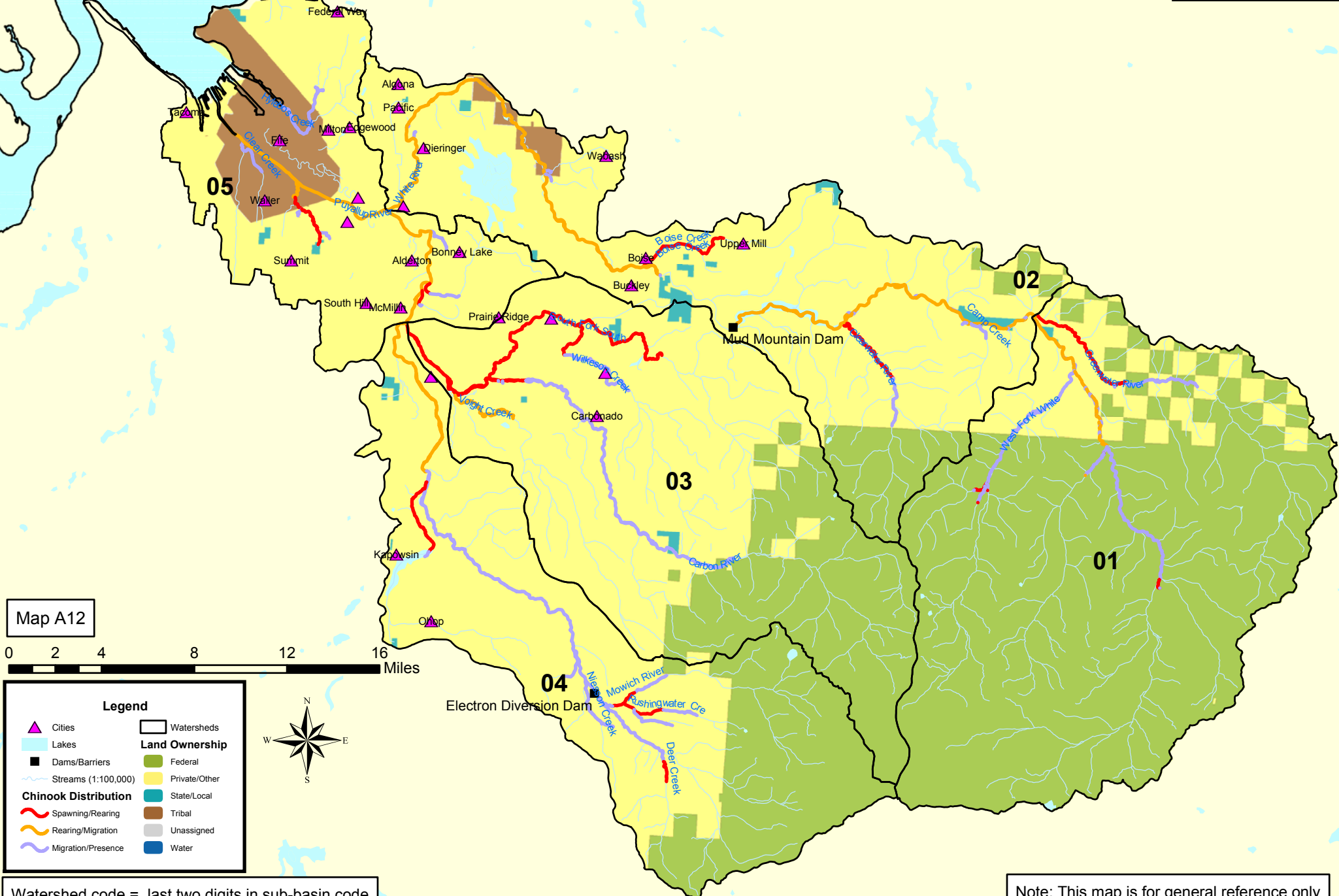
Watershed code = last two digits of sub-basin code



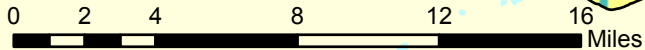
Puget Sound Distribution Duwamish Sub-basin (17110013)



Puget Sound Chinook Distribution Puyallup Sub-basin (17110014)



Map A12



Legend

- Cities
- Lakes
- Dams/Barriers
- Streams (1:100,000)
- Chinook Distribution**
 - Spawning/Rearing
 - Rearing/Migration
 - Migration/Presence

Land Ownership

- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

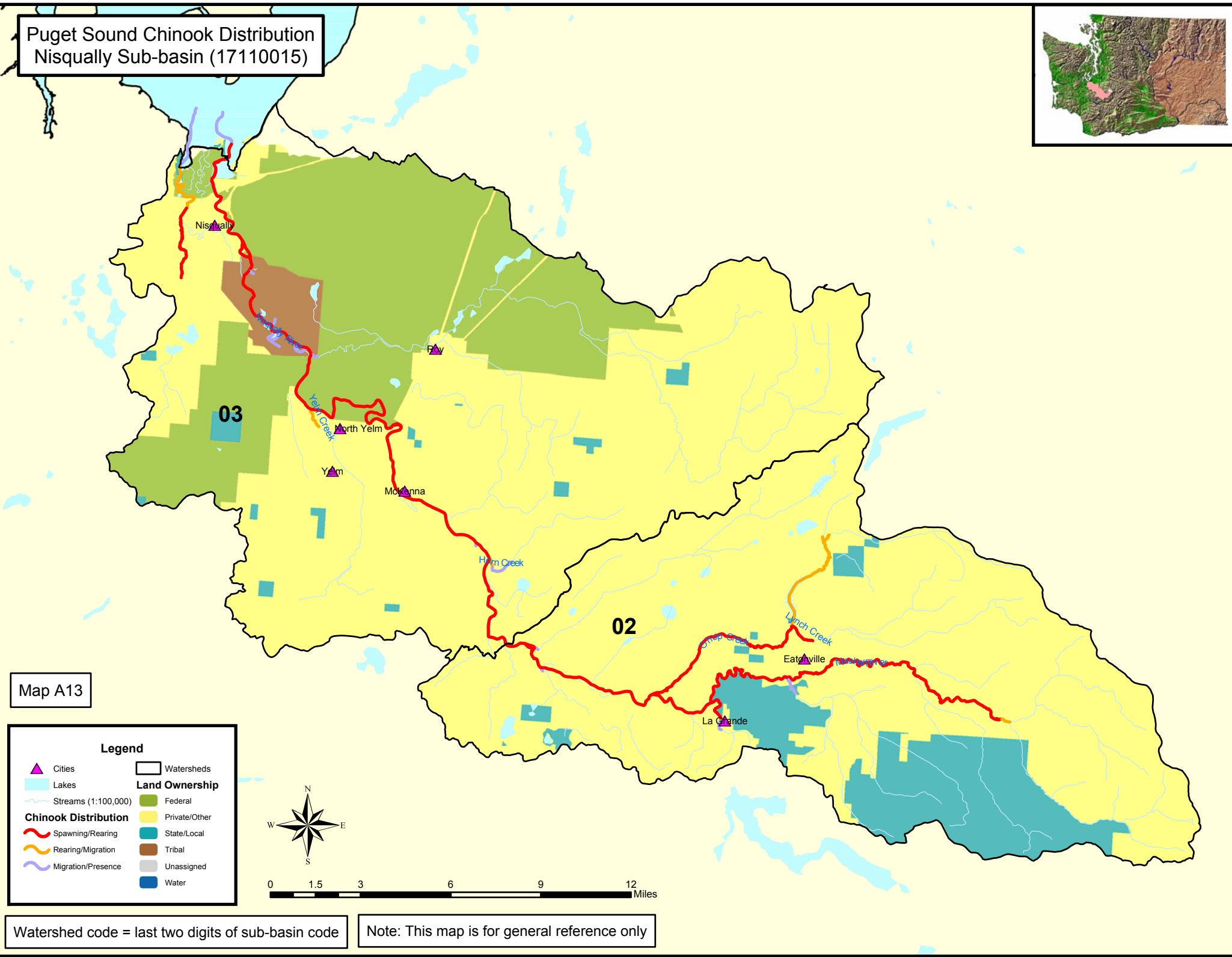
Watersheds



Watershed code = last two digits in sub-basin code

Note: This map is for general reference only

Puget Sound Chinook Distribution Nisqually Sub-basin (17110015)



Map A13

Legend

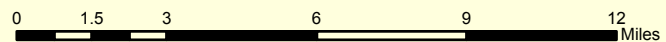
- Cities
- Lakes
- Streams (1:100,000)
- Spawning/Rearing
- Rearing/Migration
- Migration/Presence

Land Ownership

- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

Watersheds

- Watersheds



Watershed code = last two digits of sub-basin code

Note: This map is for general reference only

Puget Sound Chinook Distribution Deschutes Sub-basin (17110016)



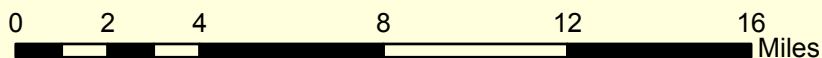
Map A14

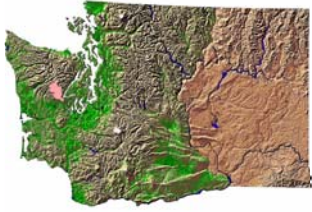
Legend

- | | |
|-----------------------------|-----------------------|
| Cities | Watersheds |
| Dams/Barriers | Land Ownership |
| Lakes | Federal |
| Streams (1:100,000) | Private/Other |
| Chinook Distribution | State/Local |
| Spawning/Rearing | Tribal |
| Rearing/Migration | Unassigned |
| Migration/Presence | Water |

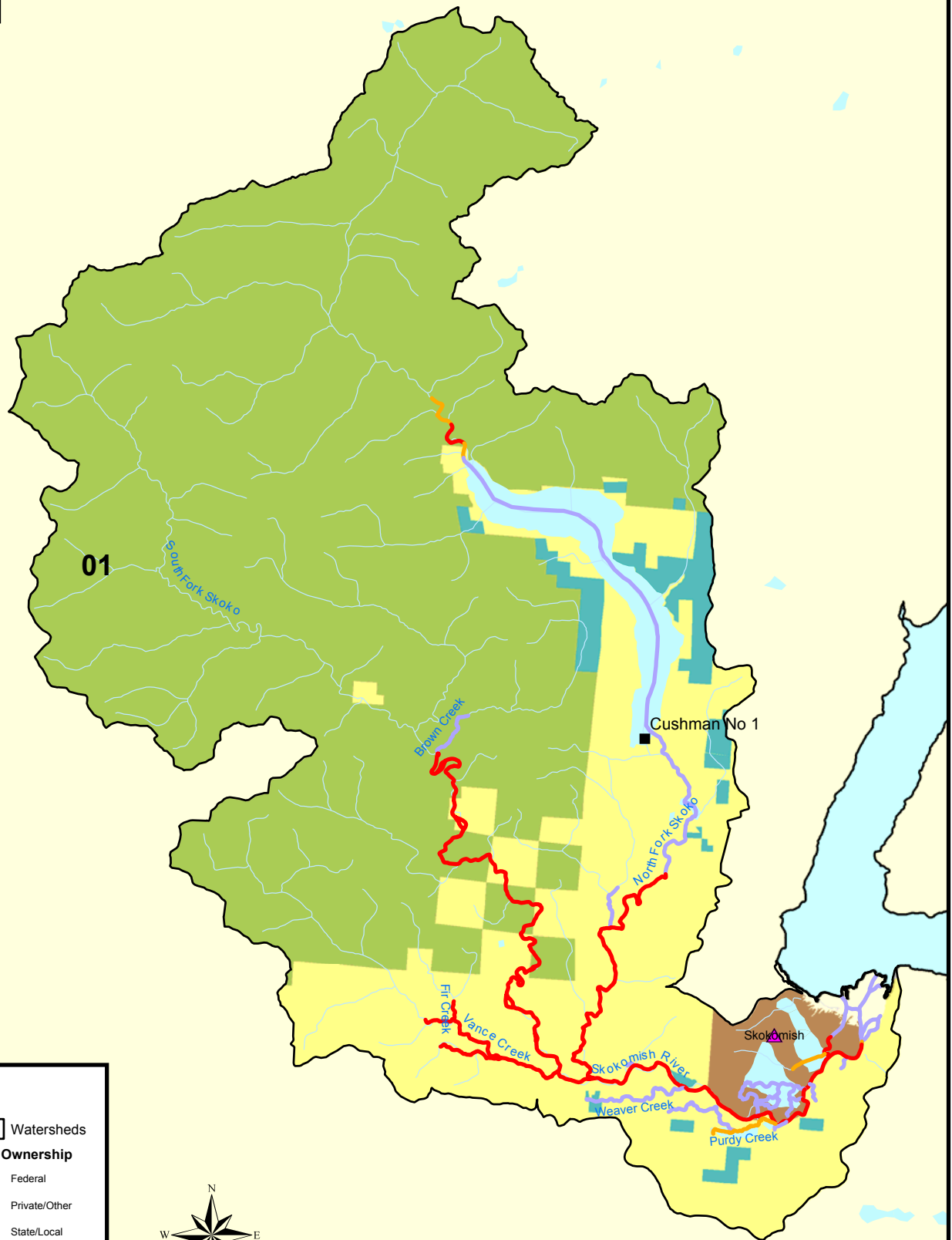
Note: This map is for general reference only

Watershed code = last two digits of sub-basin code





Puget Sound Chinook Distribution
Skokomish Sub-basin (17110017)



Map A15

Legend

- | | |
|-----------------------------|-----------------------|
| Cities | Watersheds |
| Lakes | Land Ownership |
| Dams/Barriers | Federal |
| Streams (1:100,000) | Private/Other |
| Chinook Distribution | State/Local |
| Spawning/Rearing | Tribal |
| Rearing/Migration | Unassigned |
| Migration/Presence | Water |

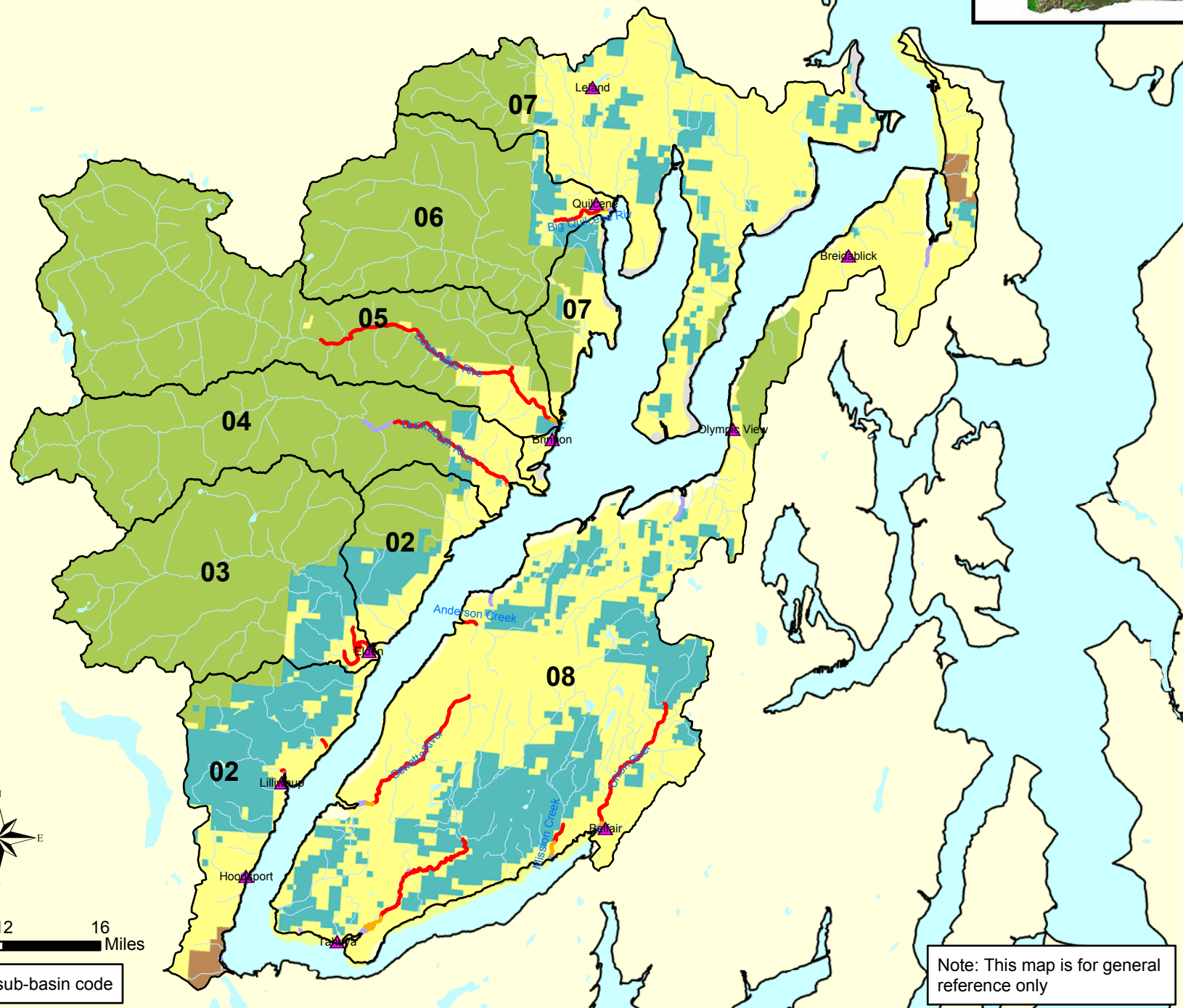


0 1.5 3 6 9 12 Miles

Watershed code = last two digits of sub-basin code

Note: This map is for general reference only

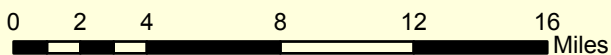
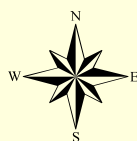
Puget Sound Chinook Distribution
Hood Canal Sub-basin (17110018)



Map A16

Legend

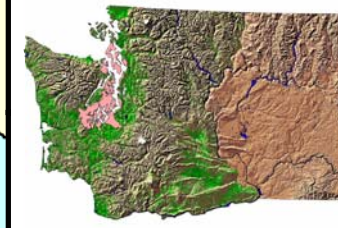
Cities	Watersheds
Dams/Barriers	Land Ownership
Lakes	Federal
Streams (1:100,000)	Private/Other
Chinook Distribution	State/Local
Spawning/Rearing	Tribal
Rearing/Migration	Unassigned
Migration/Presence	Water



Watershed code = last two digits of sub-basin code

Note: This map is for general reference only

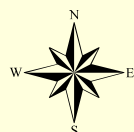
Puget Sound Chinook Distribution Kitsap Sub-basin (17110019)



Map A17

Legend

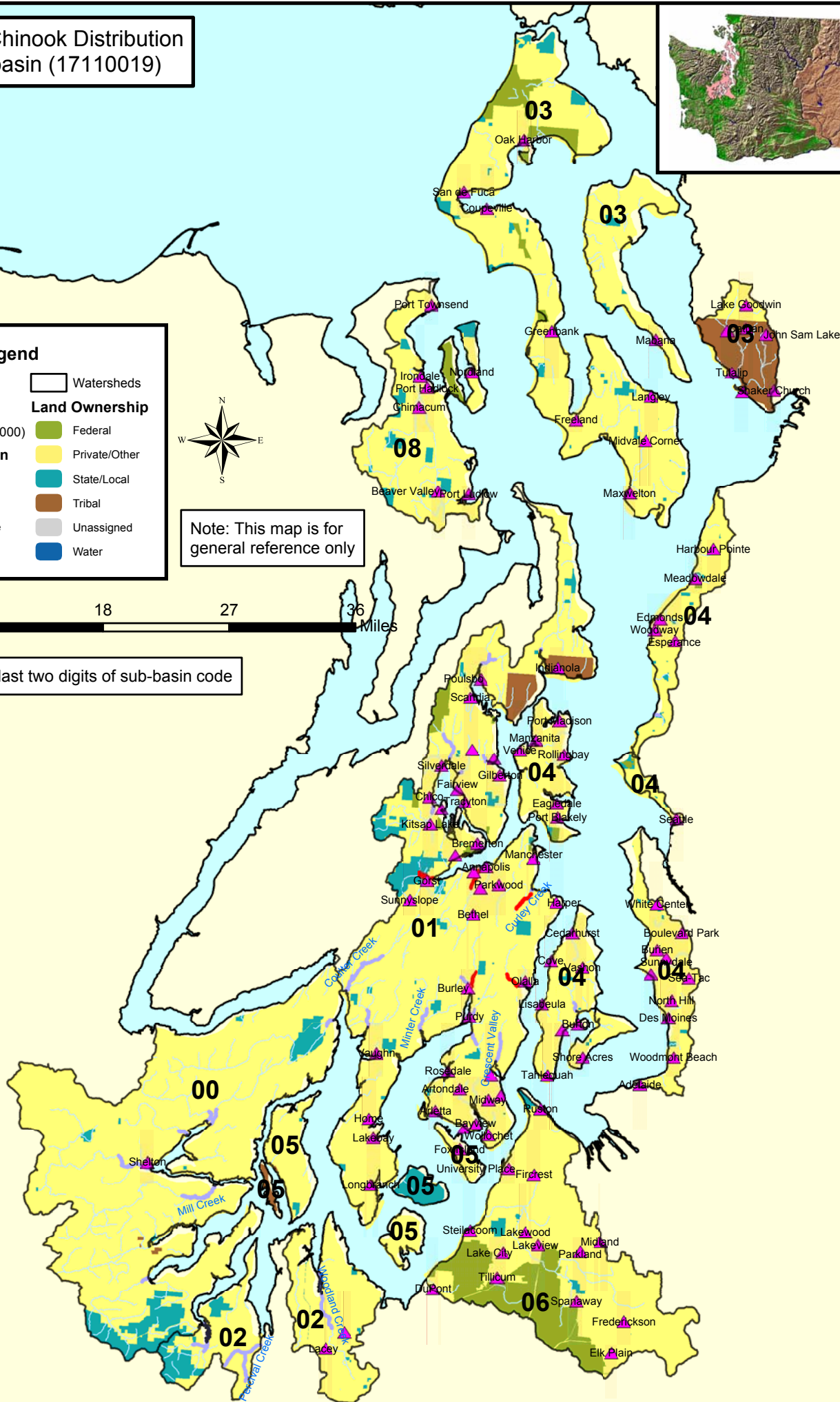
- | | |
|-----------------------------|-----------------------|
| Cities | Watersheds |
| Dams/Barriers | Land Ownership |
| Streams (1:100,000) | Federal |
| Chinook Distribution | Private/Other |
| Spawning/Rearing | State/Local |
| Rearing/Migration | Tribal |
| Migration/Presence | Unassigned |
| | Water |



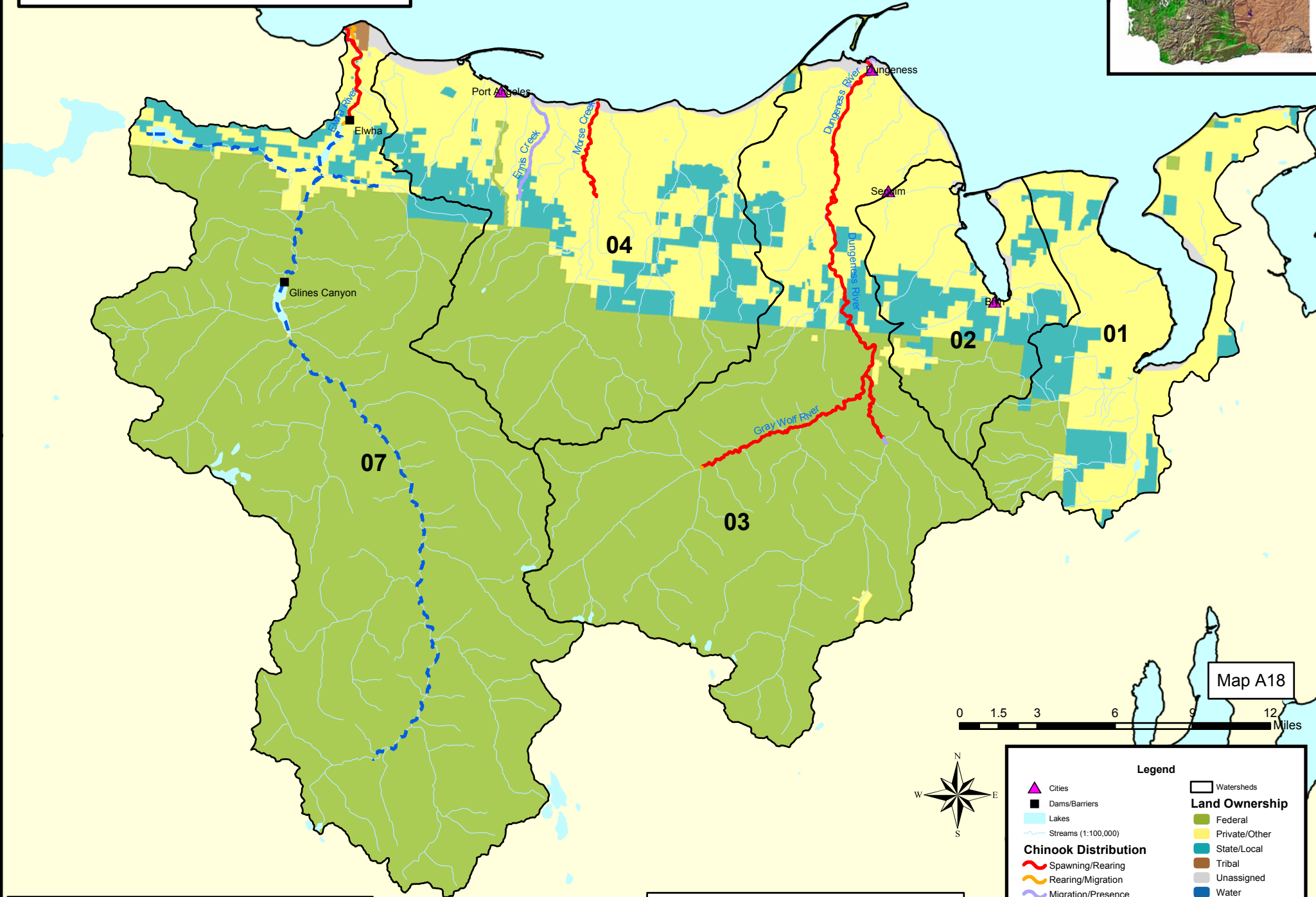
Note: This map is for general reference only

0 4.5 9 18 27 36 Miles

Watershed code = last two digits of sub-basin code

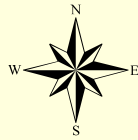


Puget Sound Chinook Distribution
Dungeness/Elwha Sub-basin (17110020)



Watershed code = last two digits of sub-basin code

Note: This map is for general reference only



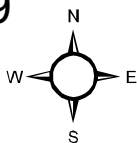
Map A18

Legend

- Watersheds
- Land Ownership**
 - Federal
 - Private/Other
 - State/Local
 - Tribal
 - Unassigned
 - Water
- Chinook Distribution**
 - Spawning/Rearing
 - Rearing/Migration
 - Migration/Presence
 - Unoccupied but may be essential
- Cities
- Dams/Barriers
- Lakes
- Streams (1:100,000)

Puget Sound Chinook Salmon Nearshore Zones

Map A19



0 3 6 12 18 24 Miles

